

INSTRUCTIONAL GUIDE
for the
CHANG TACTUAL DIAGRAM KIT

Edited By

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Educational Research, Development, and Reference Group
Instructional Materials Reference Center
1839 Frankfort Avenue
Louisville, Kentucky 40206

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Instructional Materials Reference Center for Visually Handicapped Children
American Printing House for the Blind
1839 Frankfort Avenue
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TABLE OF CONTENTS

Introduction

Organization of the Lesson Plans

Organization of the Guide

Part I

Familiarization

Scan of the workspace

Room representation (Approach 1)

Room representation (Approach 2)

Symbolic representation of objects

Make a picture

Game activities

(Optional) Left-right relationships

Mathematics

Angle construction

Area comparisons of bounded space

Grouping and complementary numbers of five and ten

Selected equivalent fractions

Social Studies

Representation of organizational patterns

Representation of population information

Seating arrangement for governmental bodies

Science

Representation of wiring diagram

Daily Living Skills

Representation of table setting

Familiarization to dial-face orientations

Table of Contents (continued)

Part II

Orientation and Mobility

Orientation to the baseboard

Familiarization with Parallel Lines

Familiarization with Perpendicular Lines

Familiarization with a City Block

Familiarization with a Standard Intersection; Identifying Four Blocks and Two Streets

Familiarization with a Standard Intersection; Demonstrating how a Vertical Street Intersects with a Horizontal Street

Familiarization with a Standard Intersection; Identifying the Left and Right Edge/Side/Curb of a Vertical Street and the Near and Far Edge/Side/Curb of a Horizontal Street

Familiarization with a Standard Intersection; Identifying the Four Corners of an Intersection

Associating Cardinal Directions with each Edge of the CMK Baseboard

Associating Cardinal Directions with each Corner of the CMK Baseboard

Associating Cardinal Directions with Intersecting Streets

Associating Cardinal Directions with the Four Corners of a Standard Intersection

Demonstrating Traffic Movement of 2-Way Streets

Demonstrating Traffic Movement on 2-Way Streets; Making Left & Right Turns

Demonstrating Traffic Movement on One-Way Streets

Demonstrating Traffic Movement on One-Way Streets; Making Left and Right Turns

Pedestrian Traffic Flow

Grid Pattern

Familiarization with a "T" intersection

Introduction

Special materials and instructional approaches are required to meet the educational needs of students with severe visual impairments. A guiding principle in special education has been to individualize instruction for each child whenever possible. In this respect no one teaching technique or instructional approach should be considered as a "cure all" when dealing with exceptional children. Students need many opportunities to apply classroom instruction and to generalize their experiences. Consequently, activities which require tactual recognition and manipulation often stimulate student awareness while encouraging a philosophy of inquiry. This instructional approach is one of several which influence the development of systematic investigative skills which will affect many future learning experiences.

Often instructional materials and presentations are displayed visually for the sighted segment of a class while the blind student is forced to rely on verbal descriptors. It is imperative that all information provided through blackboard diagrams and illustrations be equally accessible to the student who is forced to rely on tactual or aural input for information.

During April 1973, an Institute was held to explore the extent to which the Chang Tactual Diagram Kit could be used to eliminate illustrative deficits in a number of curricular areas. Participants of the Institute were identified with resource, itinerant, residential, and mobility programs. They also had extensive experience in using the materials and/or classroom teaching experience with visually impaired children. The participants included:

Jane Brewer, Itinerant Teacher
San Anselmo, California

Roy Brothers
Behavioral Research Scientist
American Printing House for
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Robert Chin, Mobility Specialist
Redwood City, California

Irene Hawkinson, Itinerant Teacher
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The purpose of the Institute was to identify lesson objectives which would illustrate a variety of educational uses for the Chang materials. Problem areas related to instruction were identified, student needs within each area were specified, and objectives were developed. Two instructional approaches were recognized in using the kit of materials; each represents a slightly different level of student functioning. In most instances the student has examined a representation constructed by another person. After interpreting it, feedback may or may not be provided before the next diagram or representation is examined. An alternative approach may require the student to construct his own representation. This approach has been used in the evaluation process since it permits the teacher to obtain specific information related to the student's understanding of the relationships being taught. It offers additional opportunities for the student to discriminate, manipulate, and organize the materials. When possible the procedures outlined in the lessons have suggested the use of both instructional approaches.

It is anticipated that additional uses for the materials will become evident as the lessons are actually used and refined. In this respect the Instructional Guide should be considered only as the starting point for the pursuit of effective teaching. It is the sincere hope of the Institute that the Instructional Guide will be found useful, and that the lessons will serve to stimulate further developments of tactually oriented learning experiences in a variety of curricular areas.

General Organization of Lesson Plans

Institute participants identified specific problem areas commonly encountered in the instruction of visually handicapped children. The problems identified were formulated into instructional objectives and then expanded into lesson plans specifying instructional approaches. Each lesson plan includes prerequisite skills and concepts, objectives, materials needed, diagrams, teaching procedures, and suggestions for evaluation.

Since the lessons in the curricular areas are not sequenced, a listing of prerequisite skills and concepts was included. An attempt was made to list those skills or concepts which the student should possess prior to the introduction of a lesson. For example, if the lesson objective was to describe spatial relationships, prerequisites would include a knowledge of right and left, near and far, and what constitutes a corner or side. If the necessary prerequisite skills are not possessed by the student the lesson would obviously be inappropriate for the student at that point in time. However, this fact should not adversely affect the alternative teaching strategy which is evident. If prerequisites need to be taught additional lessons should be developed. Occasionally the teacher may not have complete information regarding the student's level of conceptual attainment. In this instance, it should be assumed that the prerequisite skills required to attempt the lesson are possessed by the student. The lesson would then serve as a diagnostic tool which would lead to the development of additional lesson plans.

The materials needed for each lesson are specified by shape, size, and in several cases by type of material. The teacher should become familiar with all the pieces in the kit and take some action to insure that the pieces necessary to attempt a lesson are available to the student. It is strongly recommended that when a student is required to make a diagrammatic representation that all pieces used in the lesson be stored on the upper half of the baseboard. An exception occurs in the lessons related specifically to orientation and mobility in which the whole board generally is used. An effort was made to provide a clear statement defining what each piece represents in each lesson. Of course, the materials used in each lesson should be described to the student. This will provide an excellent opportunity to reinforce the notion that real objects or structures are represented by specific pieces of the kit.

The (instructional) procedures are self explanatory and should be followed as closely as possible. The student who successfully completes each procedural step should accomplish the lesson objectives that are stated.

Evaluative procedures may focus on the successful completion of procedural activities or on terminal student behaviors required by a stated activity. Optional activities are suggested for some lessons which require the student to generalize learning from the kit to real situations. This type of evaluation represents the ultimate level of a desired performance.

Organization of the Instructional Guide

The versatility of the Chang materials permits their use in a variety of curricular areas. Part I of the Instructional Guide places an emphasis on lesson objectives in the areas of mathematics, science, social studies, living skills, and recreation. Incorporated within Part I is a section devoted to familiarization exercises. These lessons permit the student to become more fully acquainted with the materials and their uses. For example, the first familiarization lesson introduces the student to a systematic method for scanning a workspace. The second familiarization lesson presents the idea that constructions on the baseboard are abstract representations of "real" environments or objects within the environment. The successful use of the materials will depend in large measure on introducing the familiarization lessons prior to attempting those lessons which focus on specific curriculum.

Part II of the Instructional Guide presents lessons which focus on information related to orientation and mobility instruction. The original intent of the Chang materials was to enhance the development of mobility skills and spatial concepts. Quite naturally these aspects of instruction have received a heavy emphasis in the Instructional Guide. The lessons in Part II are presented in a sequential order. It is imperative that the teacher begin with lesson one and systematically develop the student's skills and concepts by following the sequence. Before attempting Part II the student should possess a thorough understanding of the lesson Scanning a Workspace which appears in the familiarization section of Part I.

PART ONE

Familiarization

The successful and productive use of new educational materials is, in part, dependent on user familiarity. Every user, teacher and student alike, should become familiar with the materials and the strategies which are used to construct tactual representations.

Familiarization

Lesson 1: Scan of the Workspace

A prerequisite to any organized or systematic examination of a tactual display is the initial scan. Research has compared several tactual scanning approaches in the course of studying map reading skills. This lesson represents the most effective procedure yet found (Berla', 1973).

Prerequisite Skills and Concepts

- a. near side - far side
- b. right side - left side
- c. right hand - left hand
- d. up - down (vertical)
- e. across (right/left/horizontal)
- f. middle

Objectives

- a. Using one half of the baseboard (12" x 18") the student will be able to tactually cover the entire area of the board in less than 30 seconds.
- b. The student will be able to use hands in a prescribed vertical scanning strategy.

Materials

- a. Baseboard from Chang Mobility Kit (CMK)
- b. One square (1" x 1")
- c. Assorted shapes: (Optional activities)
 1. One circle (1" diameter)
 2. One right triangle (1" x 1" x 1 3/8")
 3. One rectangular strip

Berla', E. P. Strategies in scanning a tactual pseudomap. Education of the Visually Handicapped. 1973, 5, 8-19.

Procedure

- a. Have student locate far, near, left, and right side of board.
- b. Note that another name for far side could be top, and near side may be called the bottom side.
- c. Place both of the student's hands on the board in the prescribed manner. The fingers of both hands are close together and the index fingers of the right and left hands are touching.
- d. Have student assume this hand position on the board in the far left corner of the board. (See diagram, figure 1)
- e. Correct and/or reinforce correct placement.
- f. Have the student move fingertips downward with a sliding movement toward the near left corner of the board reminding to keep hands and fingers together.
- g. When the student reaches the bottom side in the near left corner, demonstrate to him how to move hands to keep his place and cover a new area. Direct the student to:
 1. Keep right hand in place.
 2. Move left hand either over or under right hand to a position adjacent to the right hand.
 3. The little finger of the left hand will be in contact with the little finger of the right hand at this point.
 4. Move the right hand to a position to the right of the left hand similar to the initial position.
- h. The student is now in a position to move fingertips toward the far side of the board; the student should be directed to move his hands away from body toward the far side of the board. (See diagram, figure 2)
- i. When the student reaches the far top side, instruct him to follow the same cross hand movements.
- j. Correct and/or reinforce correct movement.
- k. Continue making a vertical scan of the remaining area.

*Note:

Unless the student has unusually small hands the entire area can be covered by 2 downward movements and 1 upward one. Students with poor hand coordination should practice the scanning movement. Attach strings to the baseboard with map tacks approximately the width of the student's two hands to create a guide for hand movement.

1. Place a small square at any point on the surface and have the student locate it. Repeat several times, correcting and reinforcing correct technique.

Optional Activities

a. Two students familiar with scanning technique can "hide" one or more shapes on the board for the other to find.

b. One student can place various pieces on board asking partner to locate, name, count, and/or describe relative position in terms of closeness to a particular side.

c. Open the board the full 18" x 24" dimensions and follow similar procedures.

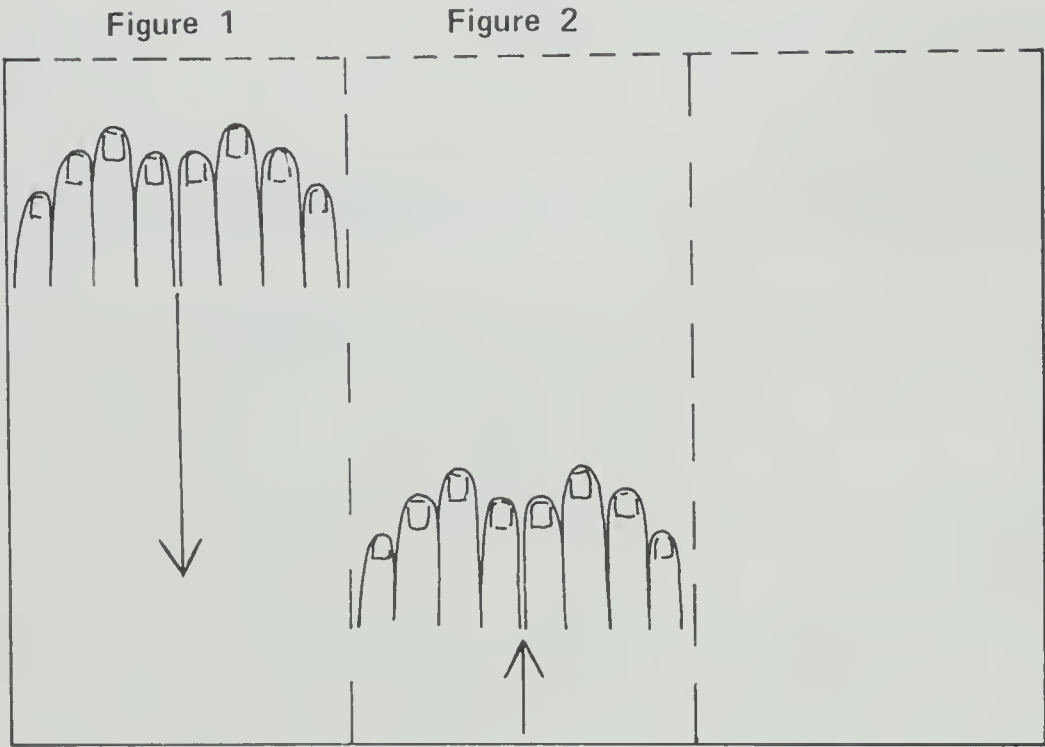
Evaluation

a. Is the student able to scan the 12" x 18" area in less than 30 seconds?

b. Is the student able to use the prescribed vertical scanning strategy?

c. Is the student able to perform cross-handed movements without hesitation?

DIAGRAM



Scan of the Workspace

Familiarization

Lesson 2: Representation of a Room by the Student (Approach One)

There are occasions when a student will be asked to represent spatial relationships within a defined area. To represent the relationships adequately it is important that the student make a diagram that demonstrates the "Top View." Two ways to represent a room are given. In the first the walls as such are represented by the four sides of the baseboard and in the second the walls are represented by long strips from the kit.

Prerequisite Skills and Concepts

- a. Ability to scan workspace
- b. Recognition that pieces represent physical features of the environment.
- c. Familiarity with physical characteristics of a classroom having four straight walls
- d. Knowledge of right angles

Objectives

The student will:

- a. use sides of one half the baseboard to represent walls of the room.
- b. represent specific objects within the room by using parts of the kit.
- c. represent the location of the teacher's desk.
- d. represent the location of doors.
- e. represent the location of student desks within the room.

Materials

- a. One-half baseboard (12" x 18")
- b. One circle (1" diameter) to represent teacher's desk
- c. Eight squares (1" x 1") to represent students' desks
- d. One rectangular strip (1/2" x 4") to represent door

Procedure

- a. Scan and clear board.
- b. Store pieces to be used and associate names with shapes.
- c. Store pieces in top half of board. (See diagram, figure 1)
- d. Student trails sides of lower half of baseboard (including fold in baseboard) recognizing that each edge represents one wall.
- e. Place strip on a diagonal at location of doorway. (See diagram, figure 2)
- f. Use circle to represent position of teacher's desk. (See diagram, figure 2)
- g. Use squares to represent position of students' desks. (See diagram, figure 2)
- h. Provide feedback to student regarding accuracy of each representation.
- i. Clear board and repeat full procedure.

*Note:

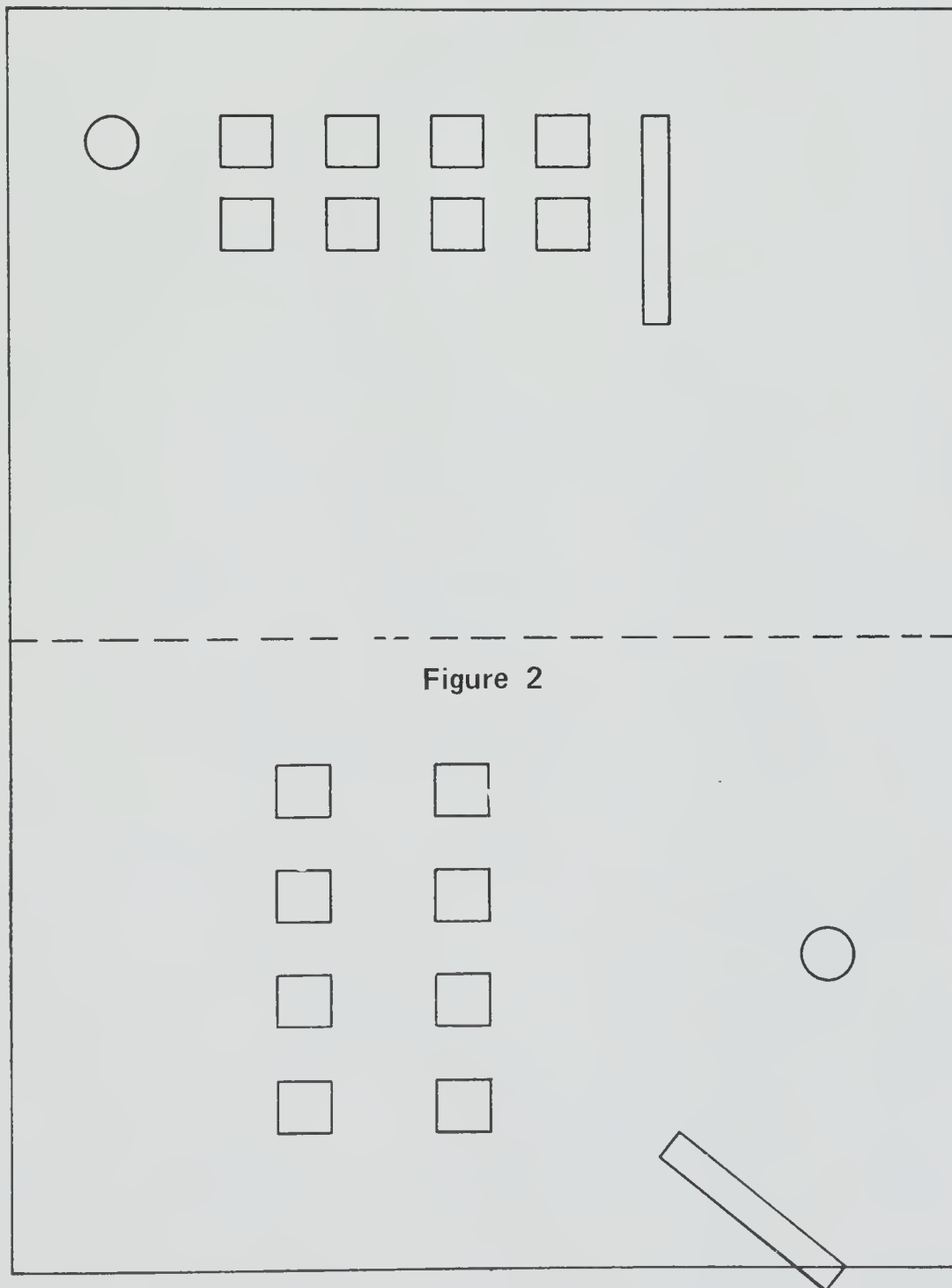
Figure 2 represents a typical classroom arrangement having one door, one teacher's desk, and several students' desks. If your room arrangement is different, adapt the lesson accordingly, but remember the student must represent the real object or structure with an appropriate piece from the kit.

Evaluation

The student successfully represents door, teacher's desk, and students' desks with appropriate pieces (i.e., diagonal strip, circle, and squares).

DIAGRAM

Figure 1



Room Representation

Familiarization

Lesson 3: Representation of a Room by the Student (Approach Two)

Prerequisite Skills and Concepts

- a. Ability to scan a workspace
- b. Recognition that pieces represent physical features of the environment.
- c. Familiarity with a classroom having four straight walls
- d. Knowledge of right angle

Objectives

The student will:

- a. represent the walls of the room on one half of the baseboard.
- b. use $1/2$ " strips to represent the four walls of the classroom.
- c. account for door openings in one or more of the walls by leaving a space between the strips.

Materials

- a. Baseboard
- b. Four rectangular strips ($1/2$ " x 6") to represent walls of room
- c. Two rectangular strips ($1/2$ " x 4") to represent walls of room
- d. One circle (1" diameter) to represent teacher's desk
- e. Eight squares (1" x 1") to represent students' desks

Procedure

- a. Review scanning procedure and clear board.
- b. Examine pieces to be used and associate names with shapes.
- c. Store pieces in top half of board. (See diagram, figure 1)
- d. Student states the number of walls to be represented (4).

*Note:

Room dividers or alcoves should be disregarded at this stage of familiarization.

e. Student states the number of walls having a physical break such as a door.

f. Student first forms the doorway wall. (See diagram, figure 2)

*Note:

If necessary suggest the following; use two (2) strips to form doorway wall with a space between to represent the opening. All doors may be represented in this manner.

g. Place wall to left of doorway wall.

h. Place wall to right of doorway wall.

i. Student checks that walls are placed at a right angle.

j. Position the last wall opposite the doorway wall. (See diagram)

k. Use circle to represent position of teacher's desk within the room.

l. Use square(s) to represent position of students' desks within the room.

Optional Activities

a. "What room is represented" (Procedure) One student chooses a room that his fellow student is familiar with and constructs it. Partner then attempts to name the room. Discuss omissions or changes that need to be made.

b. Represent a room and ask partner to identify the student or students who sit at a particular desk(s).

*Note:

Describe position in relation to the teacher's desk or one of the walls.

Evaluation

The student successfully represents the classroom.

DIAGRAM

Figure 1

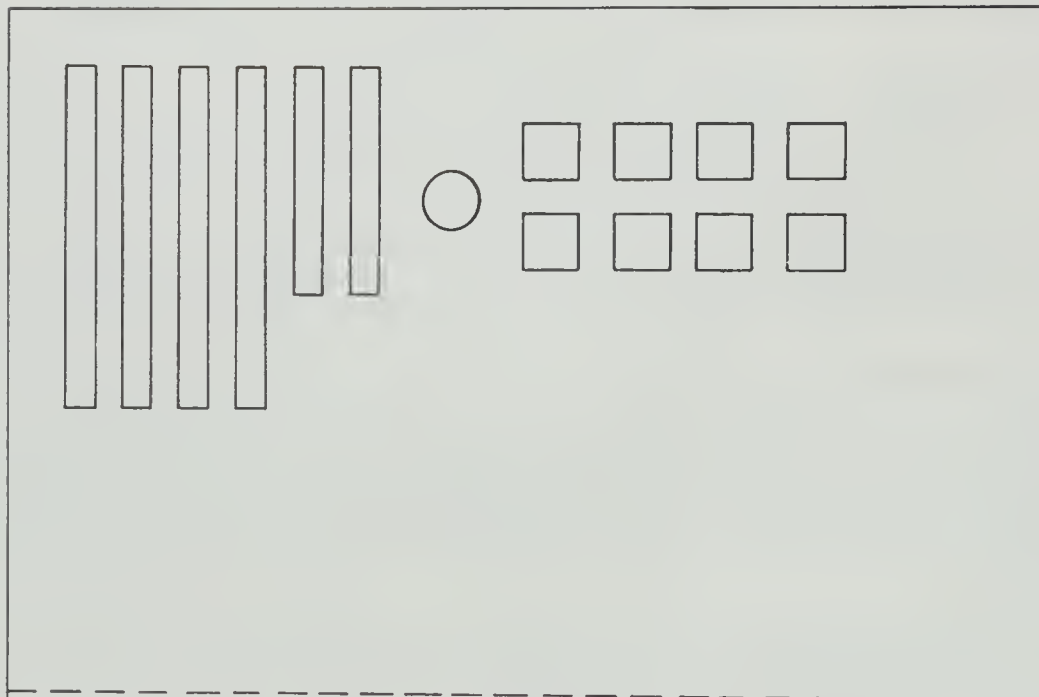
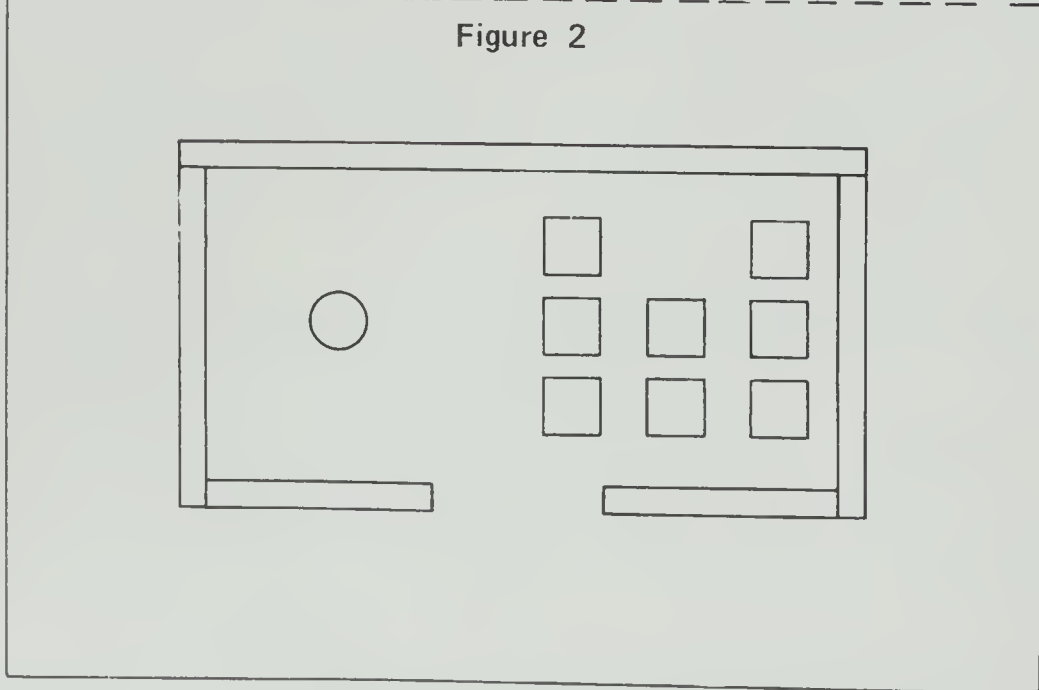


Figure 2



Room Representation

Familiarization

Lesson 4: Symbolic Representation of Objects

Special provisions are needed to supply the blind student with information comparable to that gained visually by sighted classmates. The blind student relies most heavily on verbal explanations and information gained tactually. Real objects should be used for illustration whenever possible; but, there are instances when abstract representations are more practical and as effective.

In using maps, symbols are used to represent things that people have built or that occur naturally in the environment. A symbol stands for something and takes the name of the object being represented. The symbol may or may not have a shape similar to the real thing, so it is important that the student recognize and accept the idea of symbolic representations.

Prerequisite Skills and Concepts

- a. Recognition of circle, triangle, and rectangle
- b. Right - left
- c. Far - near

Objectives

The student will:

- a. associate specific symbols (triangle, circle, and rectangle) with manmade and natural elements found in the environment.
- b. verbalize spatial relationships among the symbols represented.
- c. respond to a verbalized description by making a representation to fit the description.

Materials

- a. Baseboard
- b. One triangle (1" x 1" x 1") to represent a house
- c. Three circles (1" diameter) to represent trees
- d. One rectangle (2" x 4") to represent a lake

Procedure

a. Teacher places necessary pieces (triangle, circle, and rectangle) on the upper half of the baseboard. (See diagram, figure 1)

b. Student scans upper half of workspace, locates, and identifies pieces that are present.

c. Student is informed that a house, tree(s), and a lake are going to be represented on a simple map.

d. Student is informed that the house will be represented by the triangle, that the tree will be represented by the circle, and that the lake will be represented by the rectangle.

*Note:

From this point in time teacher should give directions using the terms house, tree, and lake, permitting the student to choose appropriate symbols.

e. Place the house on the baseboard near the middle right side of the board.

f. Place the tree near the house.

g. Place the lake near the far left side of the board.

h. See figure 2 for relative positions and provide feedback to the student.

i. Student describes the spatial relationships represented.

j. Teacher places house, trees, and lake in new positions. (See figure 3)

*Note:

No verbal explanation given.

k. Student examines board and verbally describes the new relationships.

l. Provide feedback to the student.

m. Student makes own map to correspond as closely as possible with the following directions.

Directions: You will represent a house, lake, and three (3) trees on a simple map. All of the necessary pieces are located on the upper half of the baseboard. The lake and trees are all located to the right of the house. Trees are located to the right and left of the lake and one tree is located closer to the house than it is to the lake.

*Note:

See figure 4.

Optional Activities

Change the symbol representation. Follow similar procedures naming the triangle as a church, the circle as a supermarket, and the rectangle as a park.

Evaluation

Check accuracy of student maps and descriptions.

DIAGRAM

Figure 1

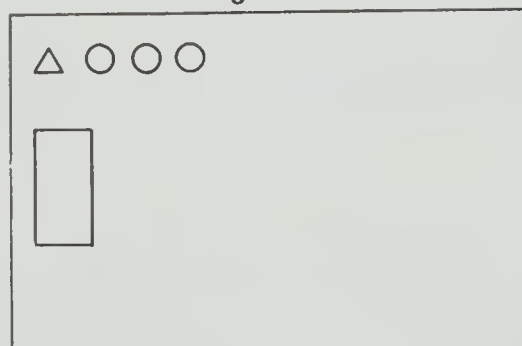


Figure 2

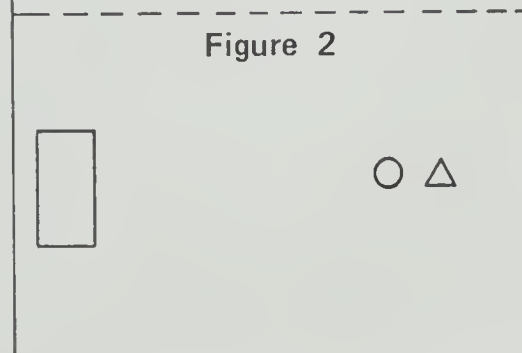


Figure 3

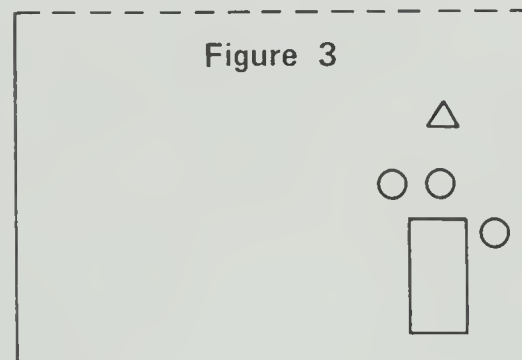
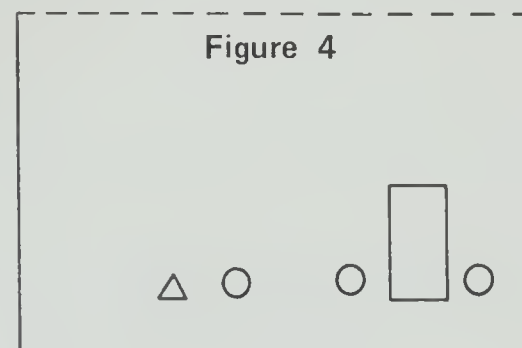


Figure 4



Symbolic Representation

Familiarization

Lesson 5: Make a Picture

In order to insure student familiarization with new and novel materials, an effort should be made to allow for creative and free manipulation of the materials. Younger children especially may use the pieces to represent familiar objects or even simple concepts of body image.

Prerequisite Skills and Concepts

- a. Knowledge of how objects are represented as outline figures
- b. Knowledge that pieces can be used to name wholes or parts of a structure
- c. Familiarity with the materials available in the kit

Objectives

The student will:

- a. represent a wagon using strips for the bed and handle and circles for the wheels.
- b. represent the outline of a house showing walls and roof lines.
- c. represent body parts using circles, rectangles, and rectangular strips.
- d. represent other objects providing names for the pieces used.
- e. manipulate and use the materials contained in the kit during free activity times.

Materials

- a. Baseboard
- b. Three circles (1" diameter) to represent wheels of wagon and head of stick figure.
- c. One rectangular strip (1/2" x 3") to represent bed of wagon
- d. One strip of velcro (1/4" x 3") to represent wagon handle
- e. Two rectangular strips (1/2" x 1 1/2") to represent arms of stick figure

- f. Two rectangular strips ($1/2'' \times 2''$) to represent legs of stick figure
- g. One square ($2'' \times 2''$) to represent body of stick figure
- h. Two rectangular strips ($1/2'' \times 6''$) to represent roof of house.
- i. Three rectangular strips ($1/2'' \times 4''$) to represent walls and floor of house.

Procedure

*Note:

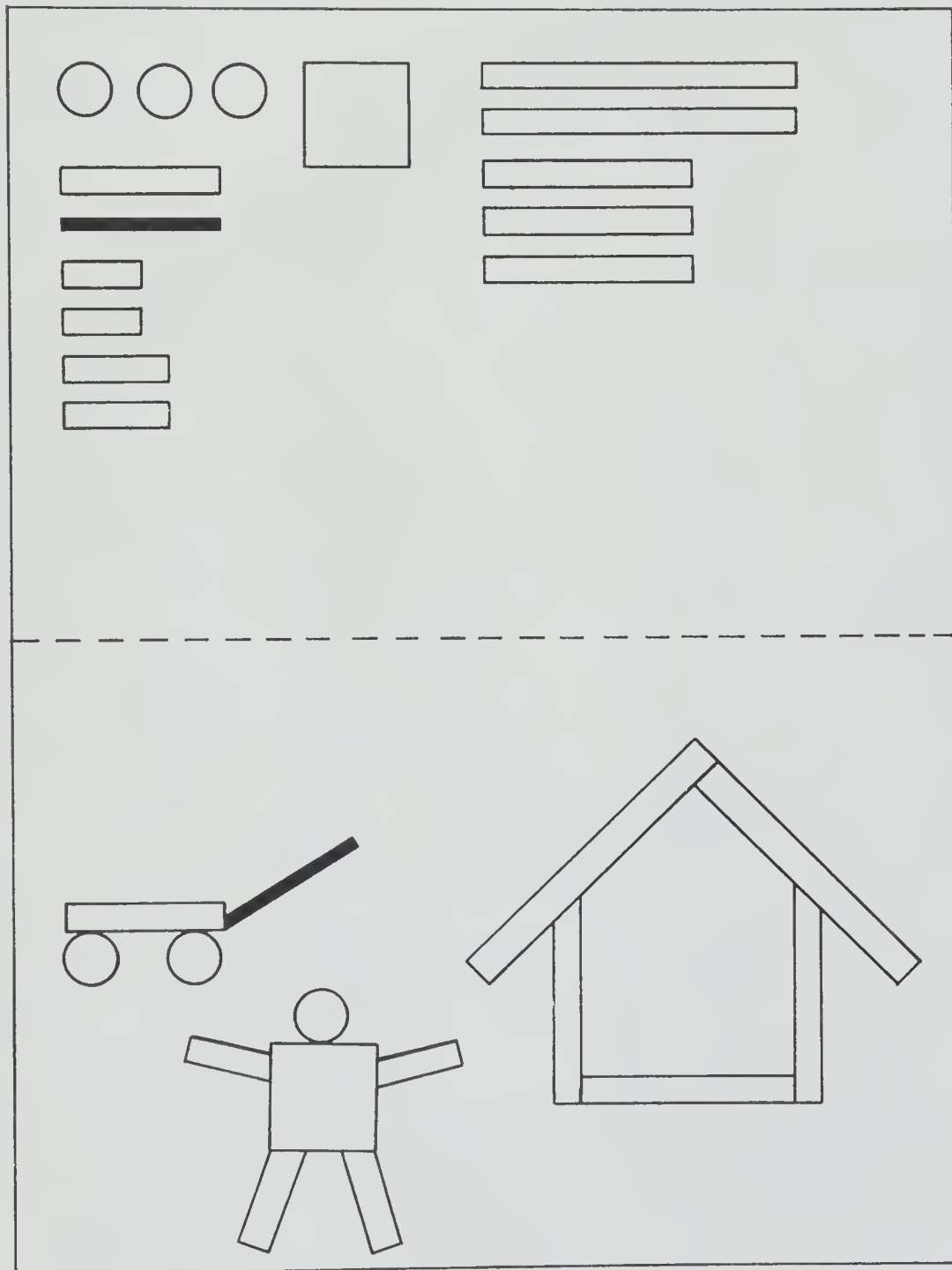
Throughout the lesson, observe and offer positive reinforcement. The age of the student, experience in manipulating materials, and reasonable teacher expectations should determine the type of correction and review that are given.

- a. Initial attempts to make a wagon, house, or body figure should be unstructured and undirected.
- b. Suggest ways first approximation might be altered by using other materials or sizes. (See diagram)
- c. Permit student additional time to develop other representations.

Evaluation

- a. Let the student name diagrams represented by the teacher.
- b. Let the student complete unfinished representations (i.e., add wheels to a wagon or car, a roof to a house, limbs to a tree, etc.)
- c. Given free time and access to the materials does the student use them?

DIAGRAM



Make a picture

Familiarization

Lesson 6: Game Activity--Tic-Tac-Toe

Students frequently engage in games at the blackboard. A special effort may be needed to insure that blind students have similar opportunities. Use of the materials in playing Tic-Tac-Toe enables the student to keep his own place, observe the moves of others, participate with sighted peers, and become familiar with the materials.

Prerequisite Skills and Concepts

- a. Concept of horizontal, vertical, and diagonal
- b. Scanning skills
- c. Understanding of rules of Tic-Tac-Toe game

Objectives

The student will:

- a. become familiar with the velcro contact.
- b. manipulate materials.
- c. engage in a game of tic-tac-toe.

Materials

- a. Baseboard
- b. Eight rectangular strips (2 - 1/2" x 6"; 4 - 1/2" x 3"; 2 - 1/2" x 2")
- c. Five circles (1" diameter) representing one player's pieces
- d. Five squares (1" x 1") representing one player's pieces.

Procedure

- a. Show the student the procedure for constructing the tic-tac-toe grid.
 1. Place two 6-inch strips of hook velcro vertically on the baseboard about three inches apart.
 2. Place two 2-inch strips of hook velcro horizontally between the two vertical strips. The distance between the two horizontal strips should be approximately 2 1/2".

3. Place the remaining four 3-inch strips in line with the two horizontal strips. Place each strip to the right and left of the vertical strip in line with the horizontal strip.

b. Have the student construct the tic-tac-toe grid.

*Note:

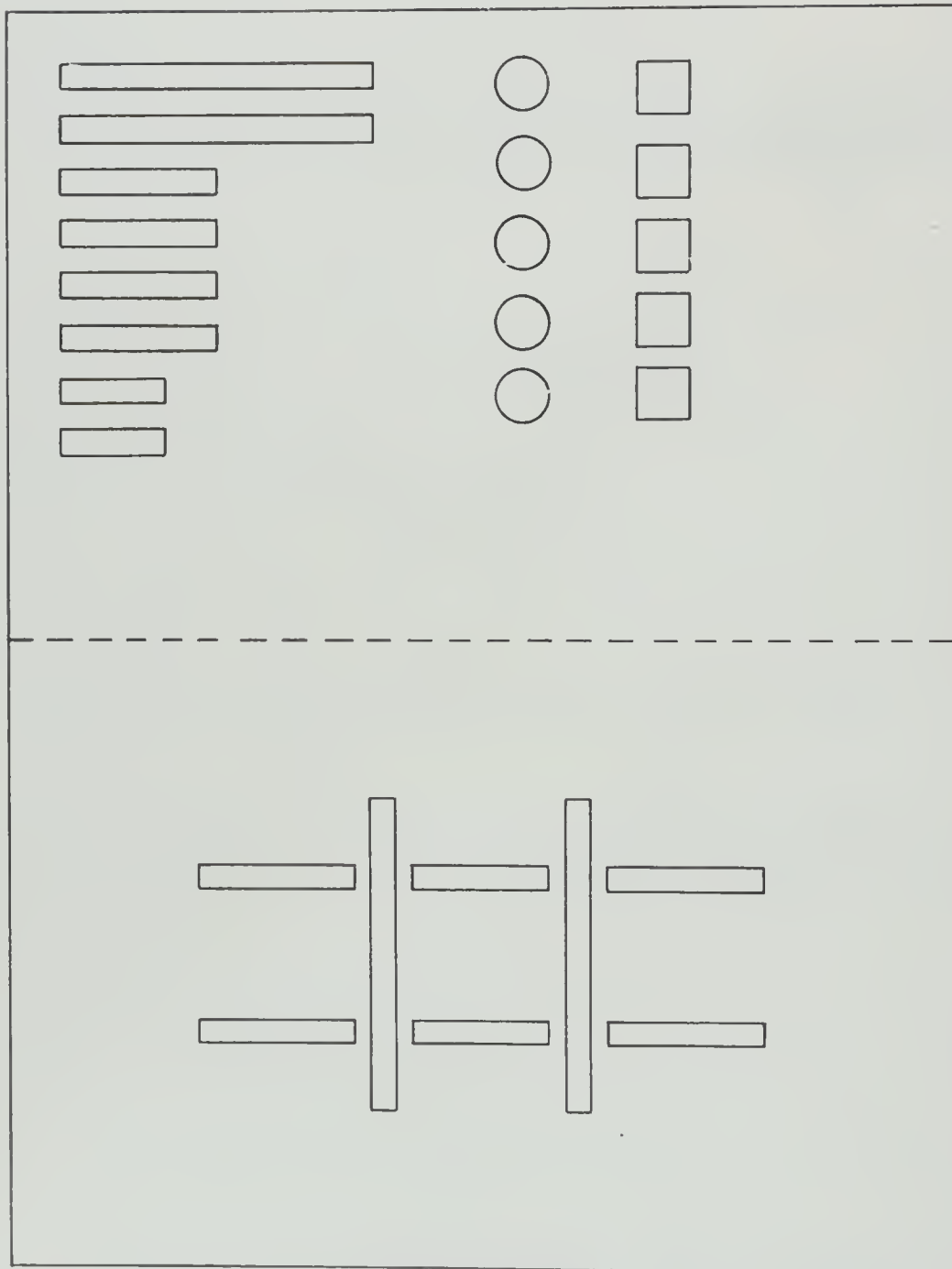
Teacher may correct and assist in initial attempts to form game-board.

c. Play begins and continues until a tie is evident or a winner is determined.

Evaluation

The student is able to set up the gameboard and play the game with sighted or blind friends.

DIAGRAM



Game Activity

Familiarization

Optional Lesson 7: Use of Stick Figure to Mirror Left-Right Relationships

All children, whether blind or sighted, need to recognize spatial relationships and object locations in terms outside of themselves. Blind students especially need opportunities to verbalize and to follow specific directions accurately. Drawings or diagrams may be used to give these relationships and should be effectively related to real situations.

Prerequisite Skills and Concepts

- a. directional-locational concepts (i.e., right-left; near-far; front-back; up-down; above-below)
- b. Manipulative skills
- c. Room representation (first approach)

Objectives

- a. The student will accurately mirror directions given from another point in space.
- b. Given directions by another person from their point of view, the student will locate specific objects.

Materials

- a. Two stick figures with face and right hand marked tactually
- b. One rectangle strip (2" x 4") representing teacher's desk
- c. One square (1/2" x 1/2") representing teacher's chair
- d. Three squares (1" x 1") representing students' desks
- e. Assorted circles and triangles (small) to represent selected objects within the room.
- f. One rectangle (1/2" x 3") representing door to room

Procedure

- a. Discuss all locational and directional referents presented in the lesson from the student's position.
- b. Student should tactually examine the face and right hand of stick figure.

c. Student holds the figure vertically before him with the figure facing the same direction as the student.

d. Examine the figure locating the face and marked right hand.

e. Question student to determine accuracy of information, (i.e., touch right hand of figure, left hand, left foot, etc.)

f. Reverse stick figure so it is facing the student.

g. Repeat directional and locational questions above.

h. Correct and review.

i. Represent room diagrammatically on one half of baseboard using approach one. (See diagram)

j. Represent teacher's desk and chair, doorway, student's desk.

k. Direct student to place stick figure representing himself in the doorway in a vertical position.

l. Ask which direction he needs to move the stick figure to get to the desk. (Student places one hand on desk and moves figure with other in accordance with his verbal response.)

m. Provide opportunity for student to correct self or confirm original statements.

n. Ask for similar directions to side of teacher's desk and from desk to the door.

o. Confirm statements by moving stick figure over the route described.

p. Add drinking fountain, pencil sharpener, chalkboard, or other landmarks one at a time, and have student give the directions necessary for movement to each location.

*Note:

Remind student to refer to the face and marked right hand of the stick figure whenever necessary.

q. Place a second stick figure at the teacher's desk location facing the student's desk.

r. Move student figure to point facing teacher's desk and figure.

s. Direct student to touch the right hand of teacher's and the students' figures.

t. Study relationships presented by the arrangement.

*Note:

Ask student to touch left hands of each, right hands of each, left hand and right hand until the student begins to understand the reversal of right and left when people face each other.

u. Direct student to give directions the teacher would follow in going from the desk to the door and other points in the room.

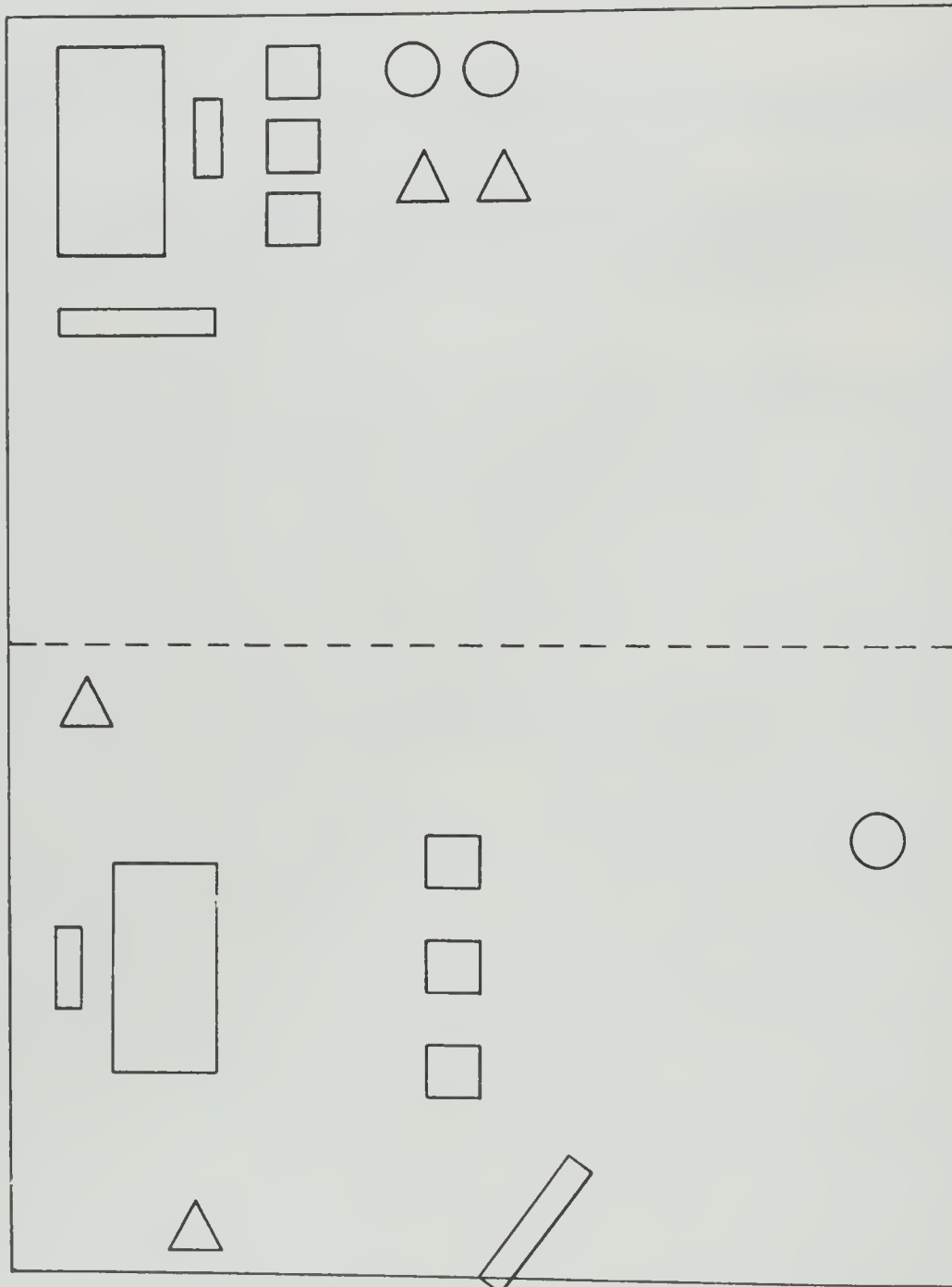
v. Correct and review.

Evaluation

a. Student will be able to describe directions needed to move to points about the room from own point of reference.

b. Student will be able to describe directions needed for other person (teacher) to move about from point to point within the room.

DIAGRAM



Mirror Left-Right Relationships

Mathematics

Mathematics is one area of the curriculum that relies heavily on the use of visual presentations. Graphing skills, geometric concepts, and the advantages of representing story problems such as the time-rate-distance type with a diagram should be within the capabilities of the student.

Mathematics

Lesson 8: Construction of acute, right, obtuse, and straight angles

Essentially angles are determined by the positional relationships of the sides. The student should be encouraged to manipulate the sides, to form different angles, and to compare different constructions within the constraints of a recognized definition.

Prerequisite Skills and Concepts

- a. Ability to name parts of angles and four types of angles
- b. Mathematical concepts of 3rd and 4th grade level. Specifically equalities, less than, more than, and definitions of angle types.
- c. Ability to follow directions

Objectives

- a. Student will construct examples of right, acute, obtuse, and straight angles with appropriate materials.
- b. To provide tangible reinforcement for the angle concepts discussed in the text and class through the procedural activities of the lesson.

Materials

- a. Baseboard
- b. Eight rectangular strips ($1\frac{1}{2}$ " x 4") to represent the sides of the angles
- c. Three angle segments (30° , 90° , 135°) for construction of acute, right, and obtuse angles. Use a straight edge to verify the construction of a straight angle. Depending upon the needs of the student, the three arcs may be labeled with braille using double stick or dymo tape.

Procedure

- a. Teacher places all materials in storage portion of board. (See diagram, figure 1)
- b. Teacher demonstrates construction of an acute angle. Teacher returns strips to storage area.
- c. Student selects two strips and constructs an acute angle.
- d. Review definition of acute angle, student determines if constructed angle meets requirements of definition.

- e. Compare constructed angle with acute angle arc provided. (See diagram, figure 2)
- f. Discuss results.
- g. Teacher demonstrates construction of a right angle. Teacher returns strips to storage area.
- h. Student selects two strips and constructs a right angle.
- i. Review definition of right angle, student determines if constructed angle meets requirements of definition.
- j. Compare constructed angle with the right angle arc provided. (See diagram, figure 2)
- k. Discuss results.
- l. Teacher demonstrates construction of an obtuse angle. Teacher returns strips to storage area.
- m. Student selects two strips and constructs an obtuse angle.
- n. Review definition of obtuse angle, student determines if constructed angle meets requirements of definition.
- o. Compare constructed angle with obtuse angle arc provided.
- p. Discuss results.
- q. Teacher discusses construction of a straight angle.
- r. Student selects one strip to illustrate construction of a straight angle.
- s. Review definition of straight angle.
- t. Use a straight edge to test the construction.

Evaluation

- a. Student will be able to construct and differentiate four types of angles.
- b. Student will be able to associate each type of angle with arc segments provided.

DIAGRAM

Figure 1

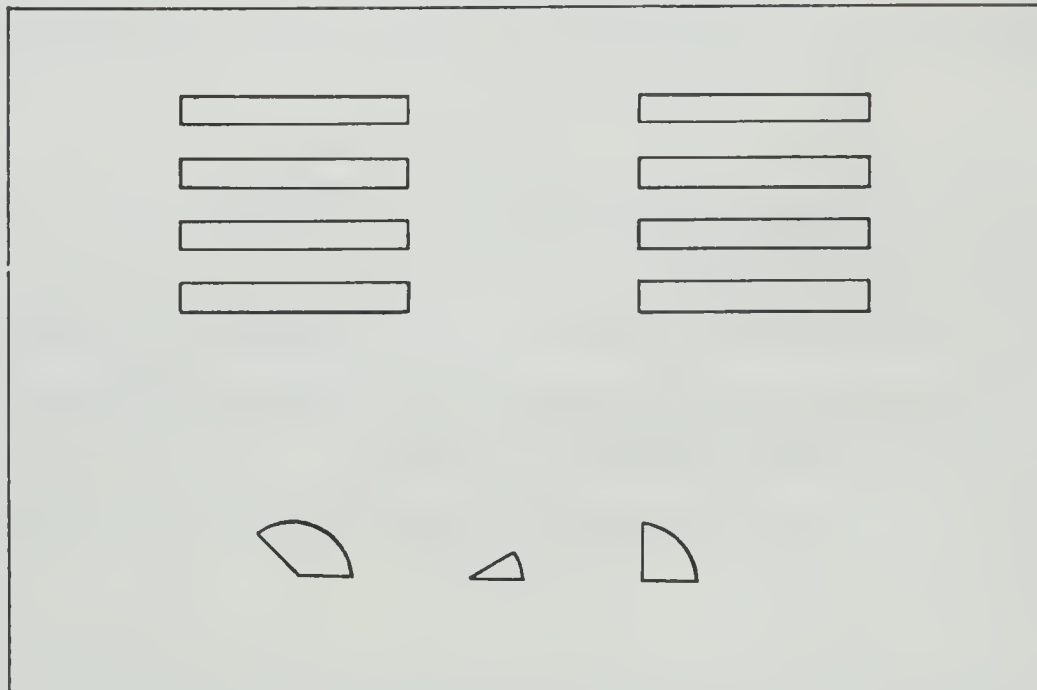
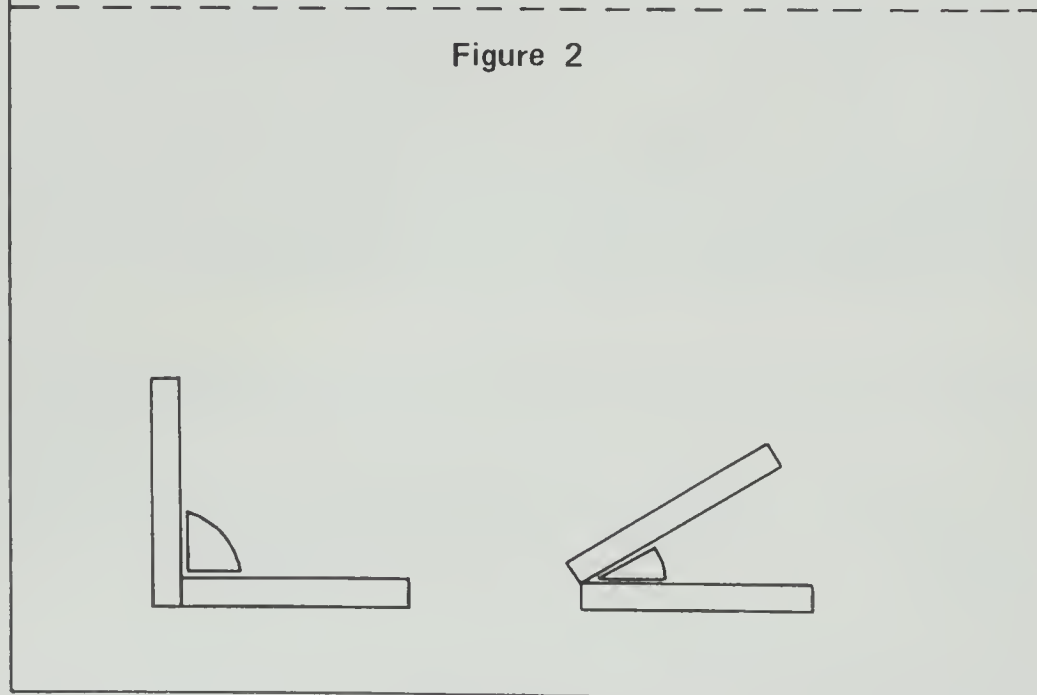


Figure 2



Angle construction

Mathematics

Lesson 9: Comparison of the shape, size, and area of bounded space

A recent emphasis in teaching science has focused on student involvement and discovery. With the vast majority of students a decision can be based on a simple visual inspection, but blind students need sufficient opportunities to tactually explore and manipulate the elements before conclusions are drawn.

Prerequisite Skills and Concepts

- a. Recognize characteristics of a square and rectangle (i.e., four right angles, parallel sides, opposite sides equal in length.)
- b. Concept of diagonals
- c. Use of scissors for optional activity

Objectives

The student will:

- a. compare the size, shape, and area of two triangles formed as a result of dividing a square with a diagonal line or cut.
- b. compare the size, shape, and area of two triangles formed as a result of dividing a rectangle with a diagonal line or cut.

Materials

- a. Baseboard
- b. Square ($3\frac{1}{2}" \times 3\frac{1}{2}"$)
- c. Rectangle ($3\frac{1}{2}" \times 4\frac{1}{2}"$)
- d. Two right triangles ($3\frac{1}{2}" \times 3\frac{1}{2}" \times 5"$)
- e. Two right triangles ($3\frac{1}{2}" \times 4\frac{1}{2}" \times 5\frac{1}{2}"$)

Procedure

Have student:

- a. Store all necessary pieces on upper half of board.
- b. Pick up square and note length of sides. (Hint: lay index finger along each side in turn before making judgment.)
- c. Locate far right and near left corners of square emphasizing a diagonal relationship.

d. Hold the square placing right thumb and forefinger on far right corner and left thumb and forefinger on near left corner.

e. Review and discuss diagonals.

f. Identify other diagonal corners of the square.

g. Pick up triangle $3\frac{1}{2}'' \times 3\frac{1}{2}'' \times 5''$ and note longest side. Compare area of this triangle with other triangles.

h. Place square on baseboard and cover surface with two triangles $3\frac{1}{2}'' \times 3\frac{1}{2}'' \times 5''$. (Hint: align right angle of first triangle directly over any corner of the square.)

i. Note the direction of the diagonal and the sides that form the diagonal.

j. Place both triangles on board in such a way that a different diagonal results.

k. Cover the formed square with the whole one to compare areas.

l. Clear board - Replace pieces in storage area.

m. Pick up rectangle and note different lengths of sides.

n. Locate diagonal corners of rectangle.

o. Pick up triangles (size $3\frac{1}{2}'' \times 4\frac{1}{2}'' \times 5\frac{1}{2}''$) and identify sides that will form the diagonal.

p. Place rectangle on baseboard and cover surface with two triangles just compared. (Hint: one triangle will have hooked velcro side down and one triangle will have hooked velcro side up.)

q. Note areas of triangles are equal.

Optional Activity

Give student a pair of scissors and a $3'' \times 5''$ card. Direct student to make two equal triangles from the card.

Evaluation

Given four right triangles of appropriate size form a square $3\frac{1}{2}'' \times 3\frac{1}{2}''$ and a rectangle $3\frac{1}{2}'' \times 4\frac{1}{2}''$.

DIAGRAM

Figure 1

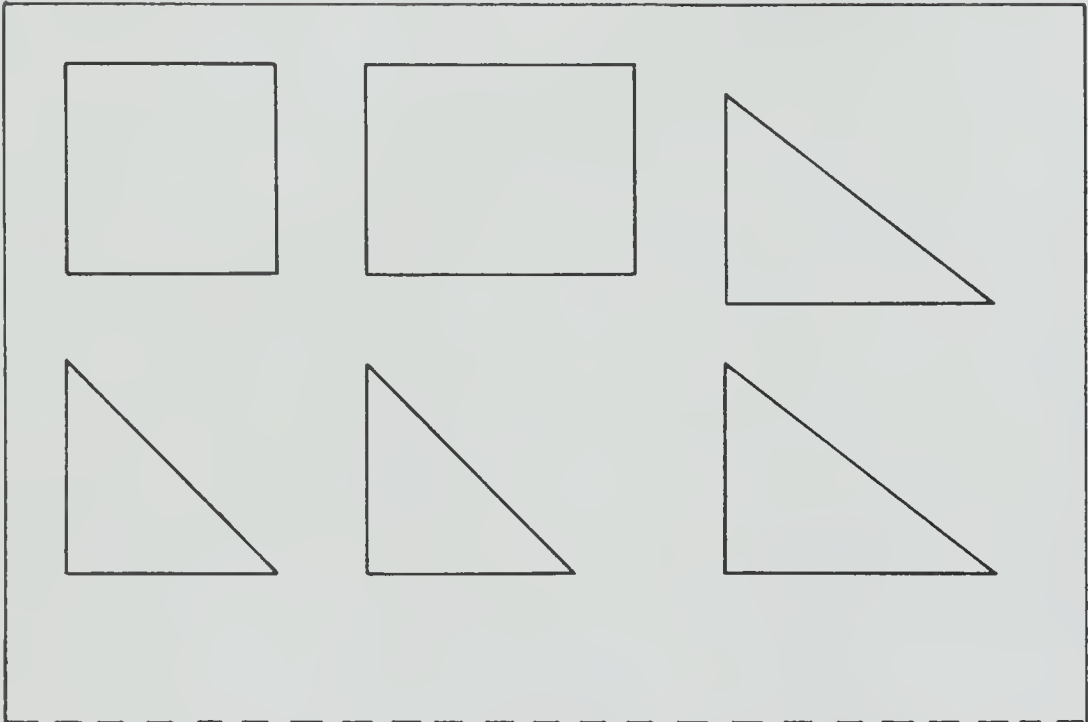
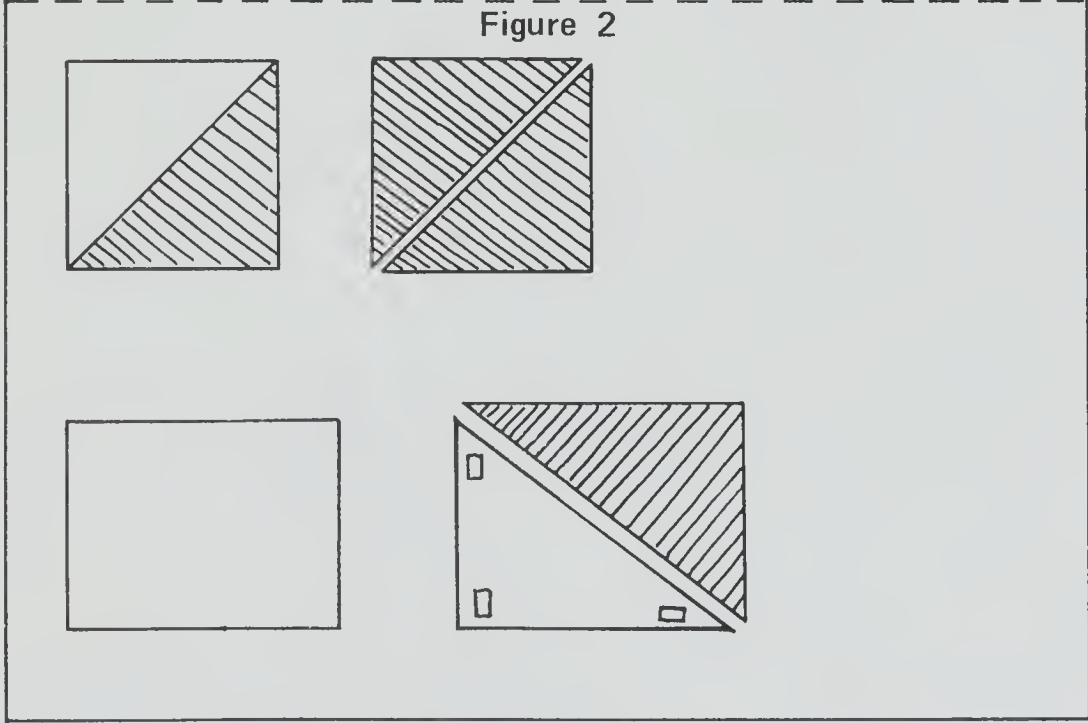


Figure 2



Comparison of Shape, Size and area.

Mathematics

Lesson 10: Grouping and Complementary numbers of five and ten

Many examples of grouping and regrouping tasks can be noted in primary arithmetic texts. Students are asked to group animals, coins, ships, blocks, etc. Concepts are reinforced through the use of workbooks and worksheets which may or may not be available to the blind student. The notion of grouping is especially important to the student as a potential user of the abacus since the understanding of complimentary numbers is essential to its efficient use.

Prerequisite Skills and Concepts

- a. Recognition that symbols stand for number values
- b. Counting skills
- c. Concept of right and left

Objectives

The student will be able to:

- a. group circles in a set of one, two, three, four, and five.
- b. state complementary numbers of five (i.e., 1 & 4; 2 & 3) in either order.
- c. state complementary numbers of ten (i.e., 1 & 9; 2 & 8; 3 & 7; 4 & 6; 5 & 5) in either order.
- d. Scanning skill

Materials

- a. Baseboard
- b. Five circles (1" diameter) to represent one unit
- c. One equilateral triangle (1" x 1" x 1") to represent five units
- d. Two strips (1/2" x 6") to structure workspace

Procedure

- a. Place two strips on board to form a vertical line dividing baseboard into a right half and left half.
- b. Place all circles on left side of board. (See diagram)

The Student:

- c. counts the circles on the left side, and scans the right side to determine that it is clear.
- d. moves one circle to the right side.
- e. counts and states the number of circles that remain on the left side of the board.
- f. moves two more circles to the right side of the board.
- g. counts and states the number of circles on the left and right sides of the board.

The Instructor:

- h. corrects and repeats procedures as necessary.

*Note:

Emphasis is on identifying all combinations possible in using 5 objects.

- i. Move all five parts to the left side of the board.
- j. Show student the triangle and inform that it has a value of five. (May associate with pennies and value of a nickel)

The Student will:

- k. remove the five circles and place the triangle on left side.
- l. add one circle to the set of five on the left side of the board.
- m. scan left side of board, discriminate shape and number of objects present, and state the number value represented.
- n. continue to add circles to the left side set until five circles and one triangle are represented.
- o. move one circle to the right side.
- p. count and state the number value represented on left side of board.
- q. move additional circles to right side of board. After each movement student counts and states number value represented on left and right sides.

The Instructor will:

- r. continue procedure, reinforce number combinations of ten.

s. inform student that five circles and one triangle will be placed on the board.

*Note:

Teacher places different combinations of ten on right and left sides of board.

Student will:

t. scan left side of board, count and state the number value represented.

u. state the number of circles that should be on the right side, then scan the right side to check accuracy of statement.

v. repeat using different combinations.

w. scan right side to determine number represented and state the number complementing ten that should appear on the left side.

x. scan left side to determine the number represented and confirm statements made.

Optional Activities

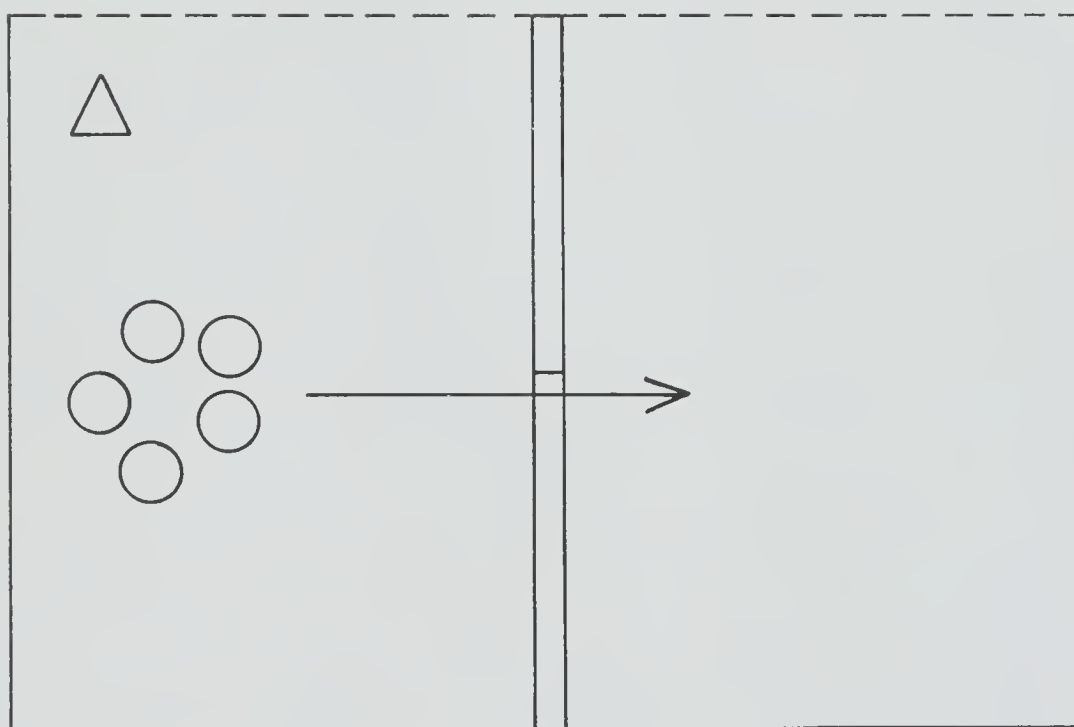
A variety of partner games appear to be possible. A partner can place an (x) number of pieces on the board. The partner can explore and state the value represented on other side. Additional triangles may be used to represent larger numbers.

Evaluation

a. Using five circles the student will represent complementary numbers of five on the right and left sides of the board.

b. Using five circles and one triangle, the student will represent complementary numbers of ten on the right and left sides of the board.

DIAGRAM



Grouping: Complementary number

Mathematics

Lesson 11: Selected Equivalent Fractions

Quite often the development of a basic concept will be derived from and require a variety of learning experiences. These experiences necessarily include the use of different approaches and materials. The blind student, especially, needs concrete materials which can be manipulated and a workspace which can be structured.

Prerequisite Skills and Concepts

- a. Skills necessary for manipulative comparisons
- b. Concept of rectangle and square
- c. Grouping skills

Objectives

The student will compare and determine the equivalence of the following:

$2/2$ and 1 ; $4/4$ and 1 ; $8/8$ and 1 .

$2/4$ and $1/2$; $4/8$ and $1/2$.

$2/8$ and $1/4$; $6/8$ and $3/4$.

Materials

- a. Baseboard
- b. Two rectangles ($2'' \times 4''$) to represent halves
- c. Four rectangles ($1'' \times 4''$) to represent quarters
- d. One square ($4'' \times 4''$) to represent a whole
- e. Eight rectangles ($1/2'' \times 4''$) to represent eighths

Procedure

- a. Store all needed parts on upper half of baseboard.
- b. Group rectangles of similar size together on upper half of board.
(See diagram, figure 1)

*Note:

Student may use trial and error procedure in following activities.

- c. Identify square and place on lower work space.
- d. Identify four rectangles that are equal to area of largest square.
- e. Form a square using the four rectangles identified.
- f. Name and label each as a quarter ($1/4$).
- g. Discuss the relationship of four-quarters equaling a whole.
- h. Remove the quarters to the storage area and retain the square in the workspace.
- i. Identify two rectangles that are equal to area of largest square.
- j. Form a square using the two rectangles identified.
- k. Name or label each as a half ($1/2$).
- l. Discuss the relationship of two-halves equaling a whole.
- m. Remove the halves to the storage area and retain the square in the workspace.
- n. Identify eight rectangles that are equal to area of largest square.

*Note:

Student may independently confirm choice by placing rectangles selected directly over the square on the board.

- o. Name and label each rectangle as an eighth ($1/8$).
- p. Discuss the relationship of eight-eighths equaling a whole.
- q. Review concepts introduced (i.e., two-halves equivalent to whole; four-quarters equivalent to whole; eight-eighths equivalent to whole).
- r. Continue instructions having student demonstrate the following:
 - 1. two-fourths equivalent to one-half
 - 2. four-eighths equivalent to one-half
 - 3. two-eighths equivalent to one-fourth

Optional activities

Have student demonstrate the following:

- a. six-eighths equivalent to three-fourths

- b. one-half plus one-fourth equivalent to three-fourths
- c. one-eighth plus three-fourths equivalent to seven-eighths
- d. one-half plus one-eighth equivalent to five-eighths

Evaluation

The lesson requires supervision and monitoring by the teacher. Teacher observation of satisfactory student performance during procedure activities constitutes the evaluation for the lesson.

DIAGRAM

Figure 1

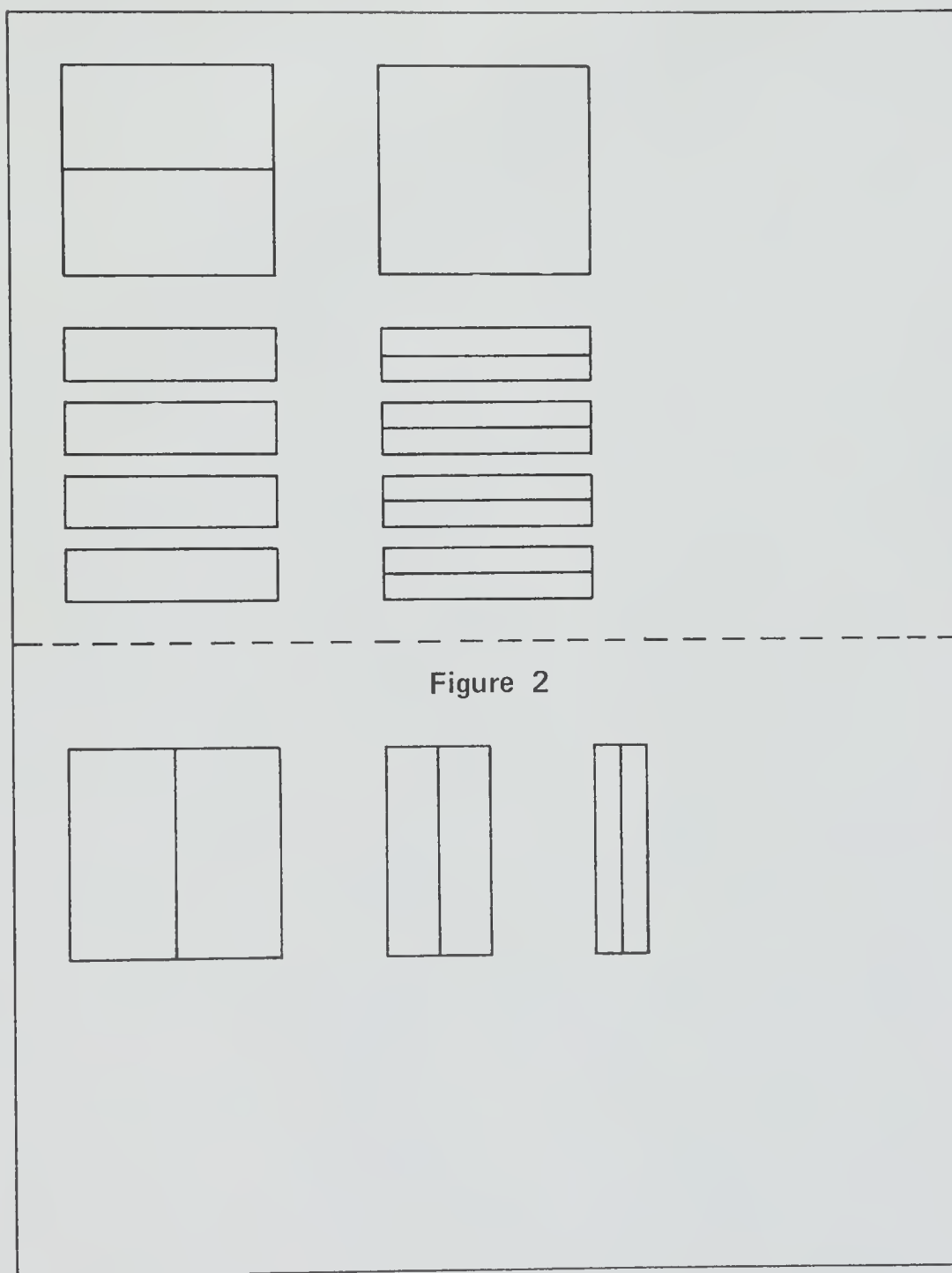
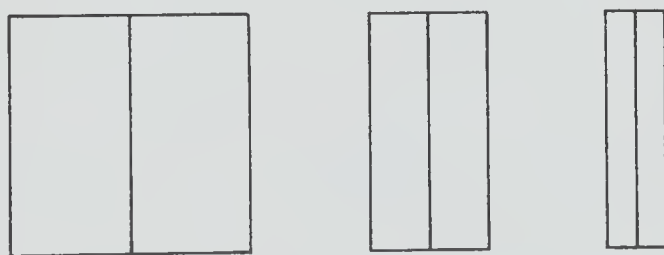


Figure 2



Equivalent Fractions

Social Studies

Initially, educators may associate social studies with the blind student's need to use maps and develop geographic concepts. While these concepts and skills are an important aspect of the educational process, it is equally important that the student be able to integrate and utilize the information found in the charts, tables, and diagrams that are encountered with such frequency in social studies texts. Although the data or information may be discussed in the narrative portion of the text, every effort should be made to provide special representations for the blind student. A representation can be used to complement an illustration and narrative by providing an organizational framework for the information.

Social Studies

Lesson 12: Representation of an Organizational Pattern

Obtaining a frame of reference is always a difficult task. Flow charts can be used to advantage in demonstrating the framework of an organization (i.e., the dependence and interdependence of each branch, lines of responsibility, etc.)

Prerequisite Skills and Concepts

- a. Tactual discrimination skills
- b. Recognize roles of different individuals within school setting
- c. Concept of up-down

Objectives

To have student represent and explain the organizational pattern of the school attended.

Materials

- a. Baseboard
- b. One circle (1" diameter) to represent office of superintendent
- c. Two circles (1" diameter) to represent school officers
- d. Two rectangular strips (1/2" x 6") to represent school faculty
- e. Six rectangular strips (1/2" x 2") to represent individual teachers
- f. Four squares (1" x 1") to represent student groups
- g. Twelve (1/4" x 3") velcro strips to represent lines of organization

Procedure

- a. Teacher constructs simple flow chart of organizational pattern for the school. (See diagram)

*Note:

The diagram depicted is intended to represent a typical organizational pattern. Adapting the diagram to your particular school organizational pattern is recommended.

- b. Student scans the chart and notes the relationship of individual roles within the system.

c. Based on the system represented, question students on areas of responsibility (i.e., to whom are teachers responsible, the student, the principal, etc.).

d. Correct errors and review.

e. Clear board.

f. Direct student to reproduce the same model.

Optional Activities

a. Students may develop own flow charts depicting other organizational patterns. Students should be required to explain representations.

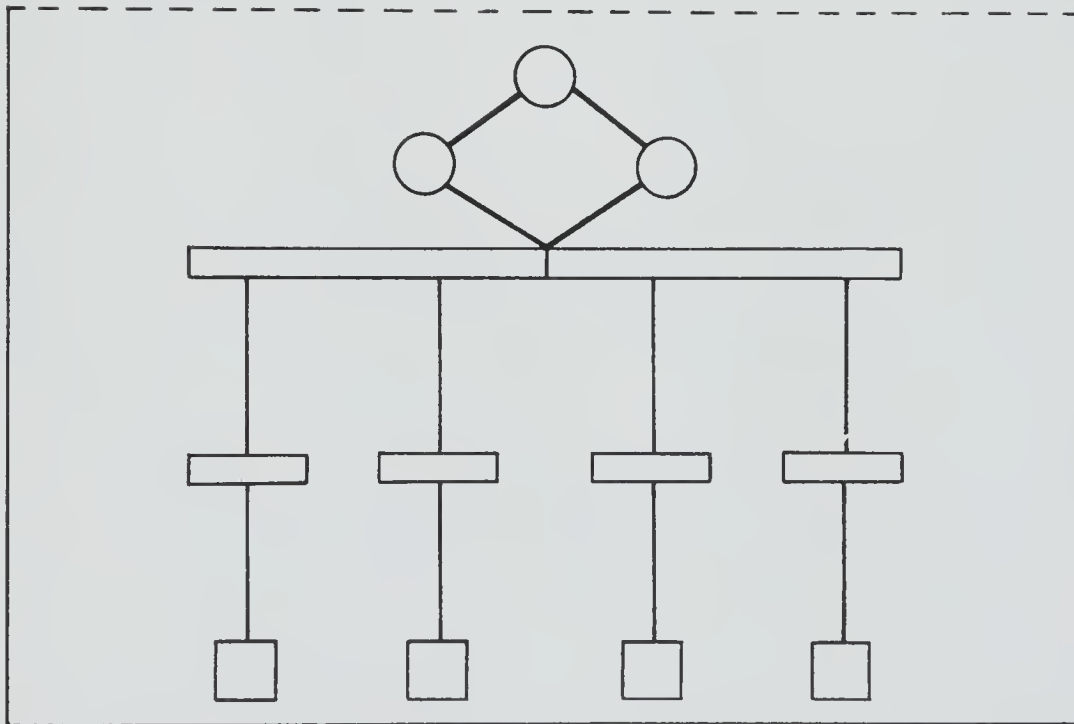
b. Students may be directed to represent an organizational pattern or flow chart consistent with information contained in social studies text.

Evaluation

a. Student can represent information through the use of a flow chart.

b. Student can orally describe the chart.

DIAGRAM



Organizational pattern

Social Studies

Lesson 13: Representation of population information

Quite commonly data is displayed through the use of graphs and charts. Basic relationships may be more easily understood when students have the opportunity to develop and use graphing techniques.

Prerequisite Skills and Concepts

- a. Left - right
- b. Up - down
- c. Fundamental 5th grade mathematics skills
- d. Concept of relationships and comparative skills

Objectives

- a. Student will have an opportunity to represent data by the use of a bar graph.
- b. Student will recognize the values of each bar in relation to the vertical and horizontal axes.
- c. Student will compare the values of each and all bars in relation to vertical and horizontal axes.
- d. Student will recognize bars that display U.S. population data for the years 1950, 1960, and 1970.

Materials

- a. Baseboard
- b. Assorted rectangular strips (1/2" width)
- c. Two strips of "Hook velcro" (10" length) to be used as vertical and horizontal axes.
- d. Eleven strips of "Hook velcro" (1/4" x 3") to be used as horizontal lines on vertical axis.
- e. Three strips of "Hook velcro" (1/8" x 2") to be used as vertical lines on horizontal axis.

Procedure

- a. Teacher constructs bar graph as given in text or from given census data. (See diagram)

b. Teacher labels the horizontal axis years; in this instance provide for 10 year increments.

c. Teacher labels the vertical axis population; in this instance provide for increments of 20 million.

d. Student identifies each bar representing a specific year.

e. Student measures length of each bar and states value represented.

f. Student compares data represented and interprets findings.

*Note:

Question concerning pattern or unusual deviations.

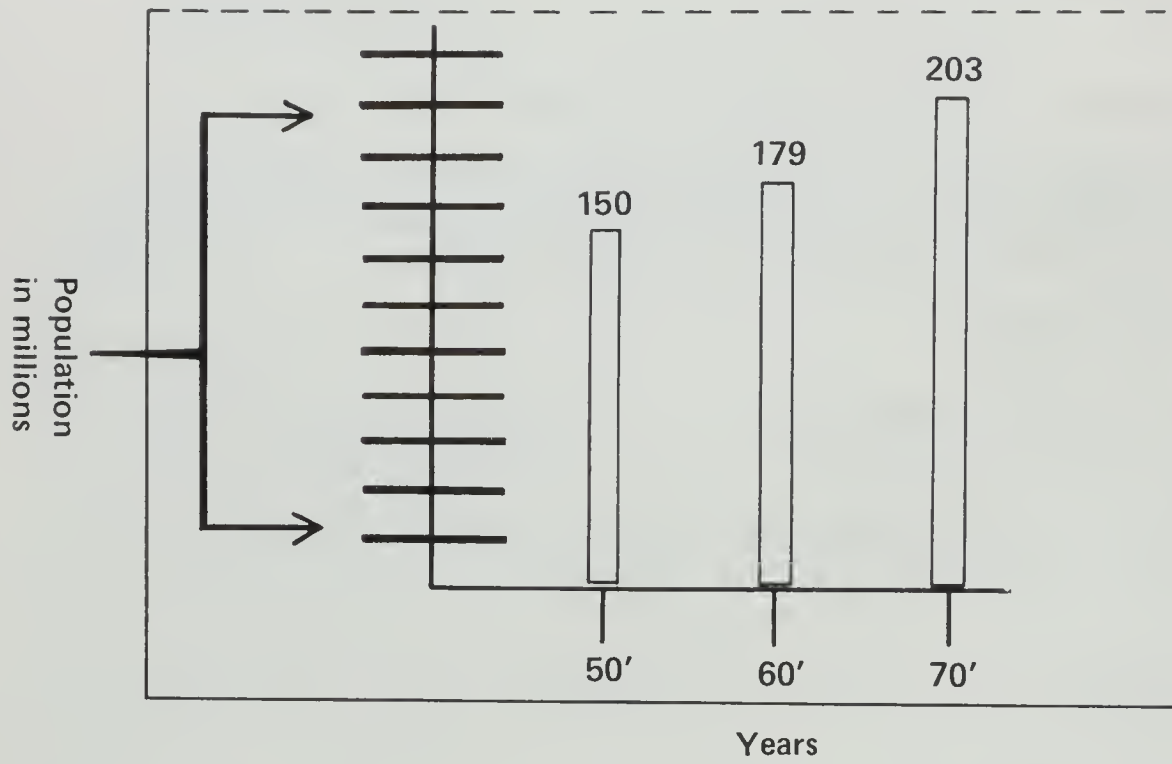
g. Student constructs a bar graph to represent specific information. Example: Keep track of the time spent out of doors each day for a week. Use a bar graph to display this information.

Evaluation

a. Student will be able to interpret information given in a bar graph.

b. Student will note and explain the population growth for years represented.

DIAGRAM



Representation of data

Social Studies

Lesson 14: Seating arrangement for governmental bodies

A representation may be used to demonstrate how parts of a national governmental body are arranged physically to promote functional efficiency. State and local governmental bodies may be depicted as well by adapting the materials and procedure to fit local situations.

Prerequisite Skills and Concepts

- a. Class discussion (i.e., seating arrangement of specific government body).
- b. Knowledge of cardinal directions
- c. Right - left concept
- d. Ability to represent room (Familiarization)

Objectives

Student will make a diagrammatic plan of the United States Senate.

Materials

- a. Baseboard
- b. Two rectangles (2" x 4") to represent party area
- c. Assorted squares and triangles (1") to represent various officials and speakers rostrum.

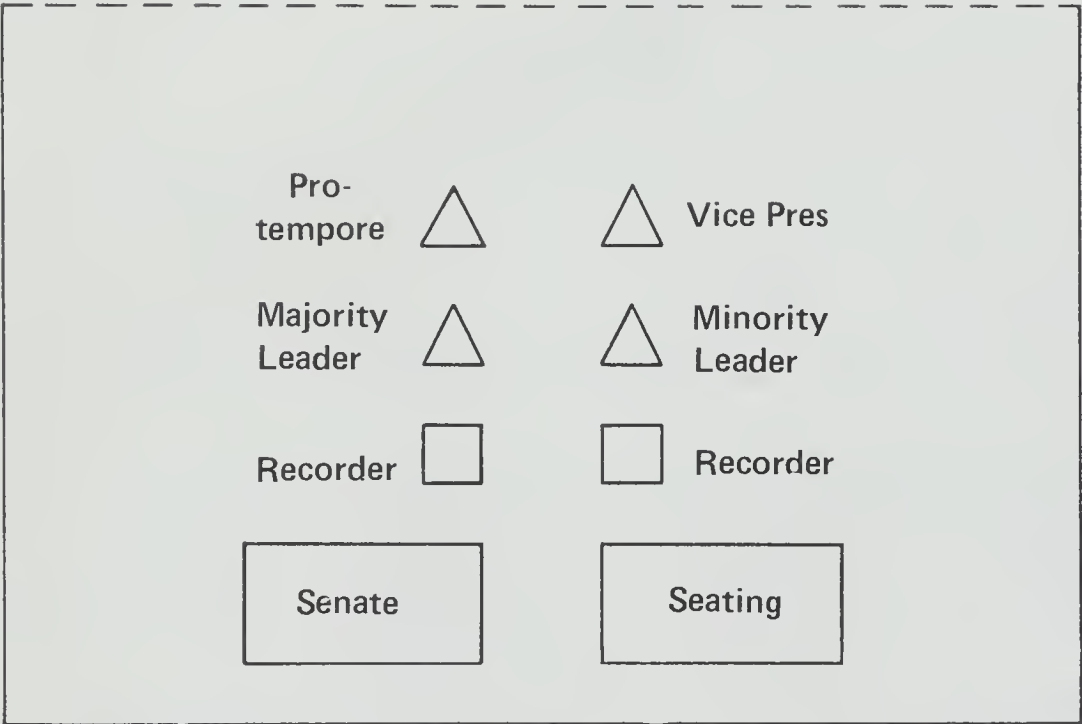
Procedure

- a. Teacher represents seating arrangement and general layout of the Senate chamber. (See diagram)
- b. Provide opportunity for student to become familiar with the representation.
- c. Discuss symbols used to represent each component and identify positions in Senate chamber (i.e., presiding officer, vice president, clerks, recorders, etc.)
- d. Explain functional activities of each component.
- e. Clear board.
- f. Provide opportunity for student to represent the Senate chamber.
- g. Correct and reinforce.

Evaluation

Satisfactory student performance during procedure activities constitute evaluation for the lesson.

DIAGRAM



Government Bodies

Science

In order to facilitate a "discovery approach" to science instruction, materials are needed to complement the skills and capabilities of the student. Manipulation of tactual representations is not a substitute for real experimental activity, but merely offers assistance in the attainment of preliminary organizational goals. Ultimately, the student must gain an understanding of the relationship between the tactual representation and the real experience.

Science

Lesson 15: Representation of wiring diagram

Many science texts and manuals detail experimental procedures which require the student to draw a diagram or outline an experimental procedure. Tactual representations may include the use of temporary braille labels using Dymo tape or double stick Scotch tape.

Prerequisite Skills and Concepts

- a. Familiarity with poles of dry cell (i.e., positive/center; negative/outer edge)
- b. Experience connecting dry cell, switch, and bell in series
- c. Concept of representing real objects and/or physical arrangements diagrammatically

Objectives

- a. Student will make a diagrammatic representation of a bell, switch, and dry cell connected in series.
 - *b. (Optional) Student will study and use a diagram of a bell, switch, and dry cell connected in parallel to replicate circuit diagrammed.
- *Optional objective dependent upon having additional materials (i.e., dry cell, switch, bell, and wire).

Materials

- a. Two circles (3" diameter) representing dry cell(s)
- b. One rectangle (2" x 4") representing bell
- c. One square (1" x 1") representing switch
- d. Five strips of velcro (1/4" x 6") representing wire
- e. One strip of velcro (1/4" x 10") representing wire
- f. Double stick tape and/or labels optional

Procedure

- a. Store necessary pieces on upper half of board.
- b. Inform student of names for objects represented by specific symbol pieces.

c. Student represents cell, switch, and bell connected in series.

*Note:

In the event materials are available, student compares representation with actual circuit.

d. Teacher develops a diagram using additional cell to show a parallel circuit. (See diagram)

e. Provide opportunity for student to study diagram.

*Note:

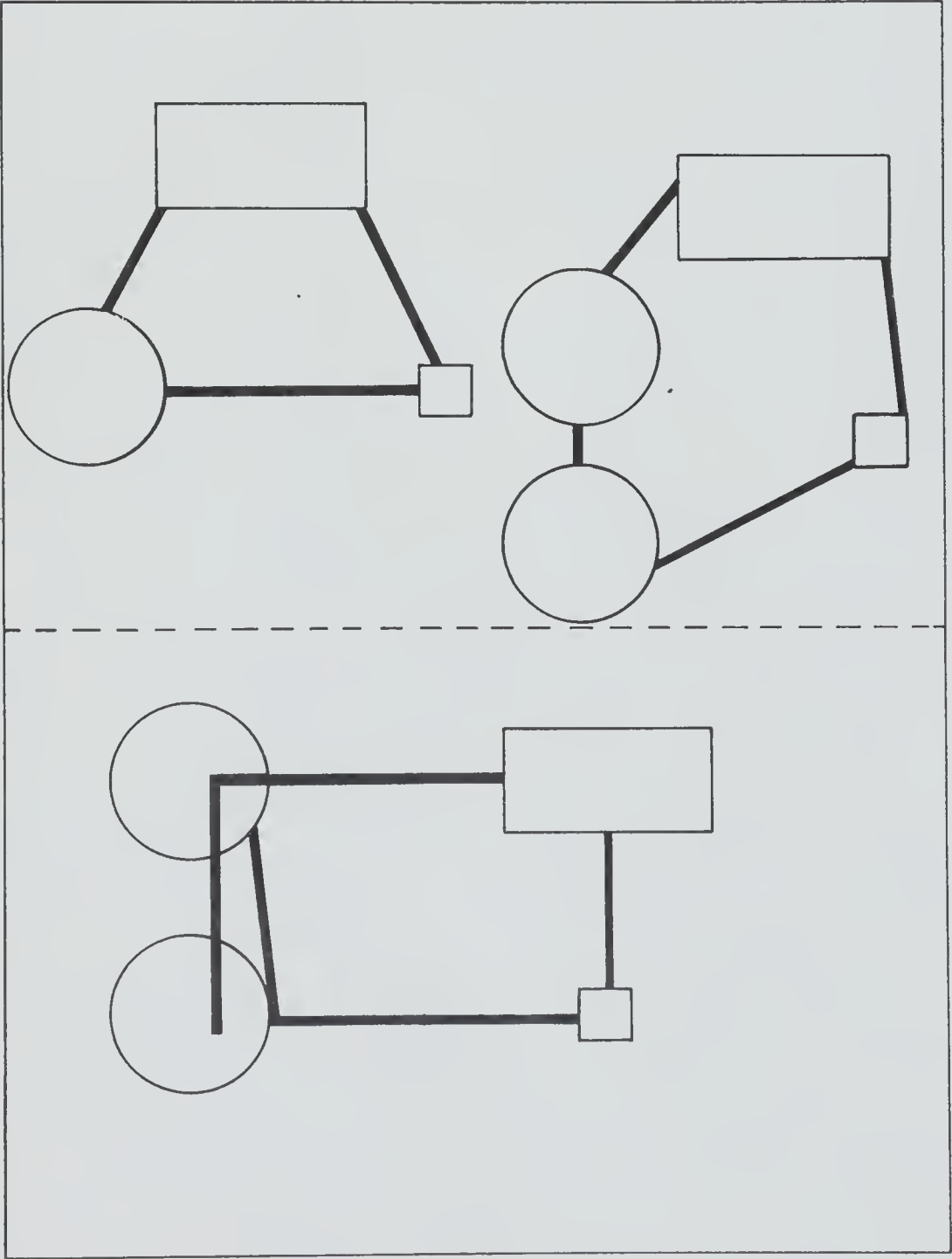
In the event materials are available student uses diagram to construct actual circuitry.

Evaluation

a. Teacher observation of student performance and the product of the activity (i.e., diagrammatic representation).

*b. In the event the student engaged in construction of actual circuitry function will determine effectiveness.

DIAGRAM



Wiring Diagram

Daily Living Skills

The area of daily living skills has become an integral part of the regular educational curriculum for blind students. Basic competencies in these skills will enhance the student's chances for a full life of successful experiences.

Daily Living Skills

Lesson 16: Representation of a Table Setting

A common task related to homemaking is setting a table properly. It is more efficient to set places at a small table from one side, without walking around the table, but often students experience difficulties in this task. The relative positions of the silverware is reversed when setting a place across the table. The following lesson may prove useful in reinforcing the concept of right and left descriptors when facing another person.

Prerequisite Skills and Concepts

- a. Students understanding of own right and left
- b. Knowledge that each person will find his knife and spoon on the right of his plate, and the fork on the left

Objectives

The student will:

- a. represent a table setting for six (6) persons on the baseboard provided.
- *b. (Optional) Follow a similar procedure in an actual table setting situation without walking around the table.

*Optional objective dependent on having additional materials (i.e., tray, dishes, tableware)

Materials

- a. The baseboard represents the table surface
- b. Six circles (3" diameter) representing plates
- c. Eighteen rectangular strips (1/2" x 3") representing six knives, forks, and spoons.

Procedure

- a. Store all pieces to be used in the upper half of the baseboard. (See diagram, figure 1)
- b. Student places plate at the near right and near left corner of table represented by the lower half of the baseboard.
- c. Student places plate at center right side and center left side of table represented by the baseboard.

- d. Student places plates at the far right and far left corners of the table opposite those plates already positioned on the near side.
- e. Student places knife and spoon as represented by strips to right of each plate from diners point of view.
- f. Student places fork as represented by strip to left of each plate from diners point of view. (See diagram, figure 2)
- g. Provide correction and reinforcement.
- h. Remove all pieces and place them in the storage area.
- i. Student repeats setting without error.

Optional Activities

- a. Student may use additional pieces (squares or circles) to represent glass at tip of knife.
- b. Represent placement of cups and/or saucer.

Evaluation

- a. Student accurately represents table setting for six (6) diners.
- b. (Optimal) Use a dining table, tray, dishes, and tableware to make a tablesetting for six working from one side of the table only.

DIAGRAM

Figure 1

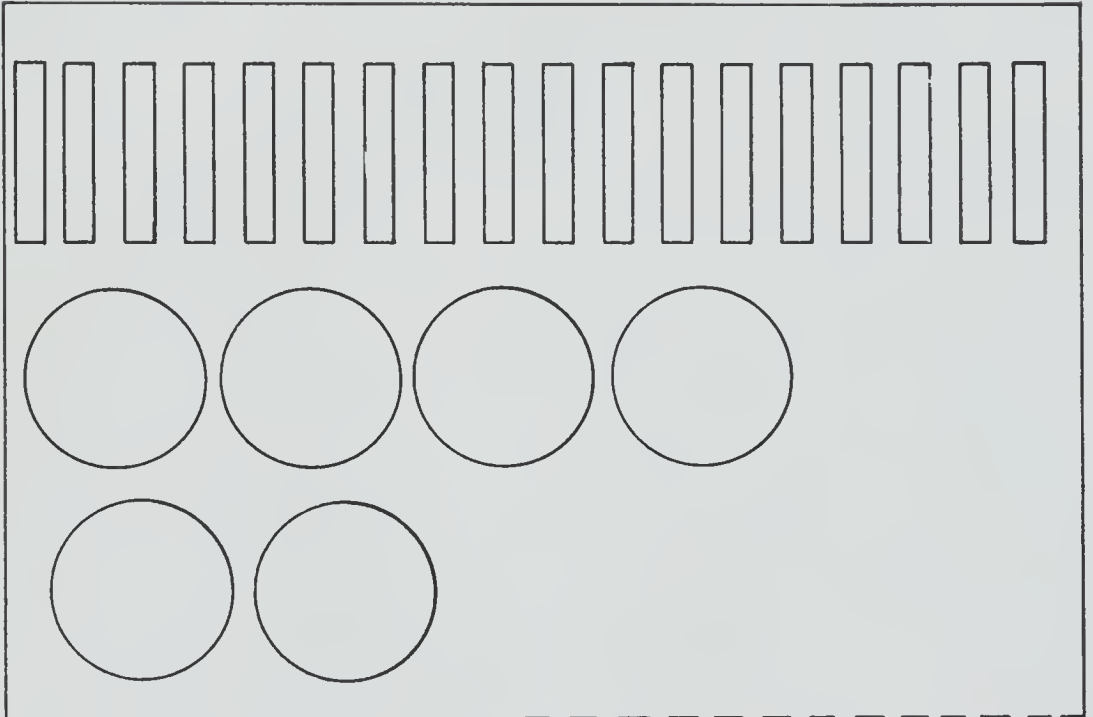


Figure 2

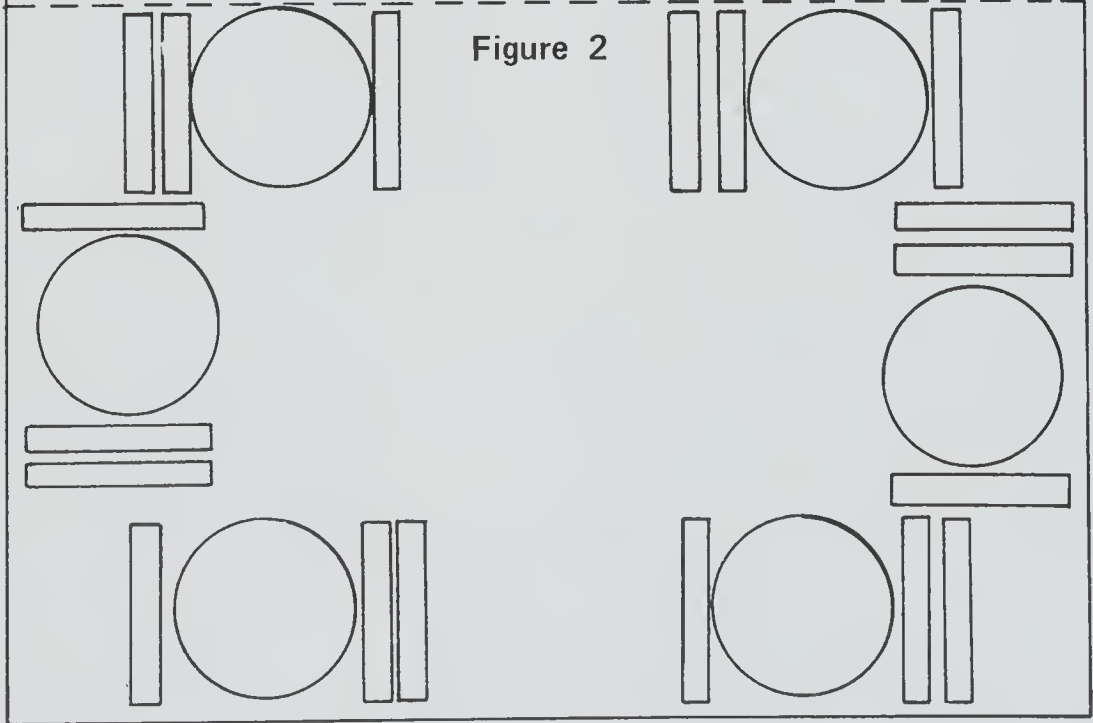


Table Setting

Daily Living Skills

Lesson 17: Familiarization to Dialface Orientations

From the military we have learned to designate positional relationships through comparisons with a clockface. Blind persons have used this skill in describing relative positions of objects or sounds within their environment. Using a dialface orientation, a workspace or area may be readily organized or structured.

Specific applications may be noted in the area of homemaking and daily living skills. For instance the placement of food on a plate can be designated by the individual or for the individual. A vacuum sweeper can be moved out toward 12 o'clock and subsequently in a systematic and clockwise movement toward one, two, and three o'clock. In preparing a pizza the cook may place salami or other ingredients around on the dough using clock positions to insure an even distribution. The result of drawing a knife through a pie in a straight line from 12 to 6; from 2 to 8; and from 10 to 4 will be six equal slices.

Prerequisite Skills and Concepts

- a. Knowledge of clockwise and counter-clockwise movement
- b. Concept of opposite, triangle, and circle

Objectives

- a. The student will demonstrate placement of 12 objects representing number positions on a clockface.
- b. The student will relate number relationships in terms of spatial arrangements presented.

Materials

- a. Baseboard
- b. One circle (5" diameter) representing clockface
- c. Twelve triangles (1" x 1" x 1") representing each number position

Procedure

- a. Store all materials in upper half of baseboard.
- b. Student places large circle near center of lower half of baseboard.
- c. Student moves finger around edge of circle in a clockwise manner.

d. Student moves finger around edge of circle in a counter-clockwise manner.

e. Teacher provides correction, reinforcement, and/or explanation.

f. Student places triangle at position of 12, 3, 6, and 9 o'clock with point of triangle touching edge of circle. (See diagram, figure 1)

g. Identify pieces opposite each other.

h. Use finger or trace a line from 12 to 6 o'clock and from 9 to 3 o'clock.

i. Student places 2 triangles between the 12 and 3 o'clock positions; the 3 and 6 o'clock positions; the 6 and 9 o'clock positions; and the 9 and 12 o'clock positions. (See diagram, figure 2)

j. Student begins at 12 o'clock positions, moving in a clockwise movement, and counts the number of triangles.

*Note:

A preliminary step in any dial discrimination or familiarization should include an examination of all tactually discriminable representations on or around the dial. Examples of dials other than clocks include cooking timers, dial thermometers, stove or oven dials, etc.

k. Student indicates triangle opposite 1, 2, 4, 5, 7, 8, 10, and 11 o'clock positions.

Evaluation

Student performance during procedure activities constitute evaluation for the lesson.

DIAGRAM

Figure 1

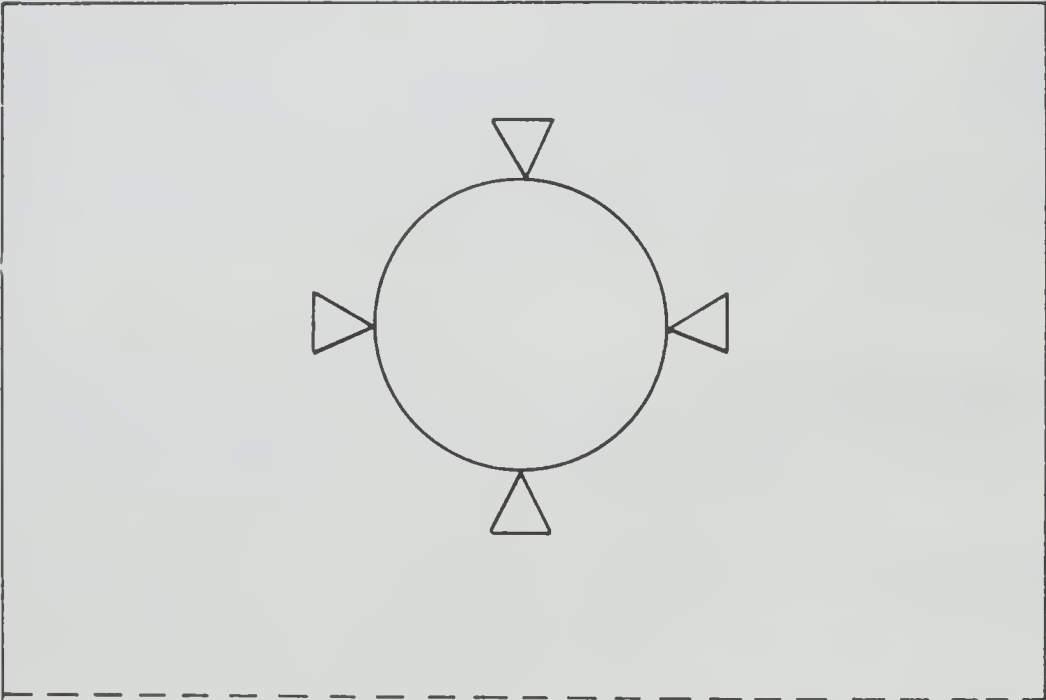
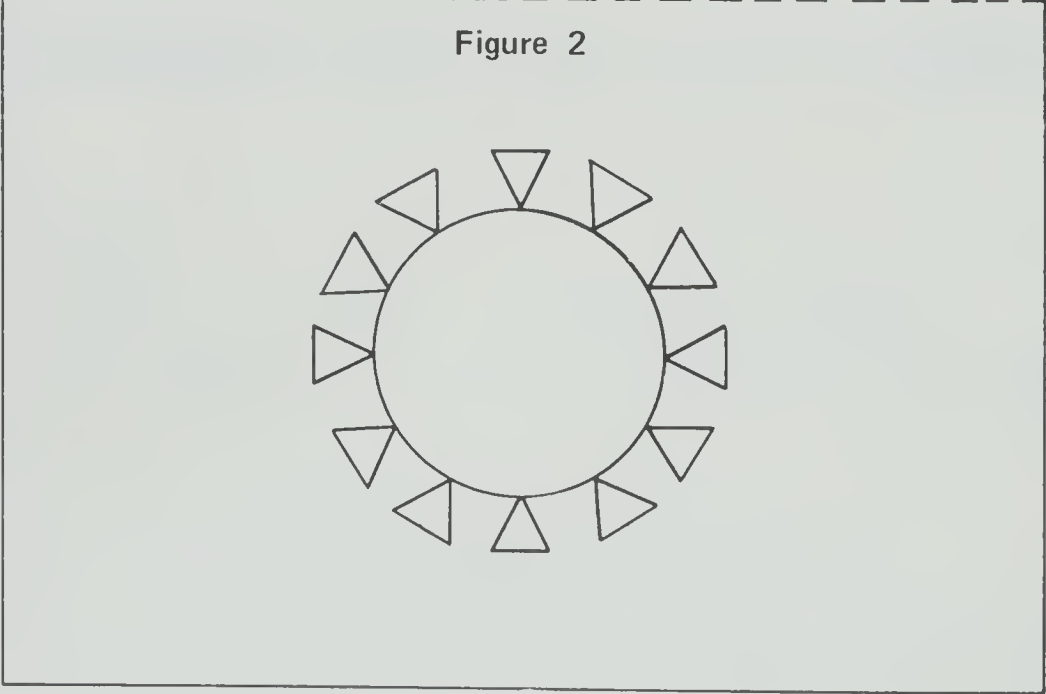


Figure 2



Dial-face orientation

PART TWO

Orientation and Mobility

The following lessons have specific application to Orientation and Mobility Instruction. It is imperative that the teacher follow the sequence of lessons when developing the students' skills and concepts. Each student attempting Part II should possess a thorough understanding of the lesson Scanning a Workspace found on page 6. The teacher should encourage the student to always conduct a systematic search of the diagram and workspace prior to a detailed examination of the diagram represented on the baseboard. Please note that the whole baseboard is used for all lessons in Part II.

Lesson 1: Orientation to the Baseboard

Prerequisite Skills and Concepts

- a. Scanning a workspace

Objectives

- a. The student will be able to associate the terms near and far, left and right, with the four sides of the baseboard.
- b. The student will be able to locate and identify the near side, far side, left side, and right side of the baseboard.
- c. The student will be able to locate the four corners of the baseboard and associate the term near right, far right, near left, and far left with the appropriate corner.

Materials

- a. Baseboard

Procedure

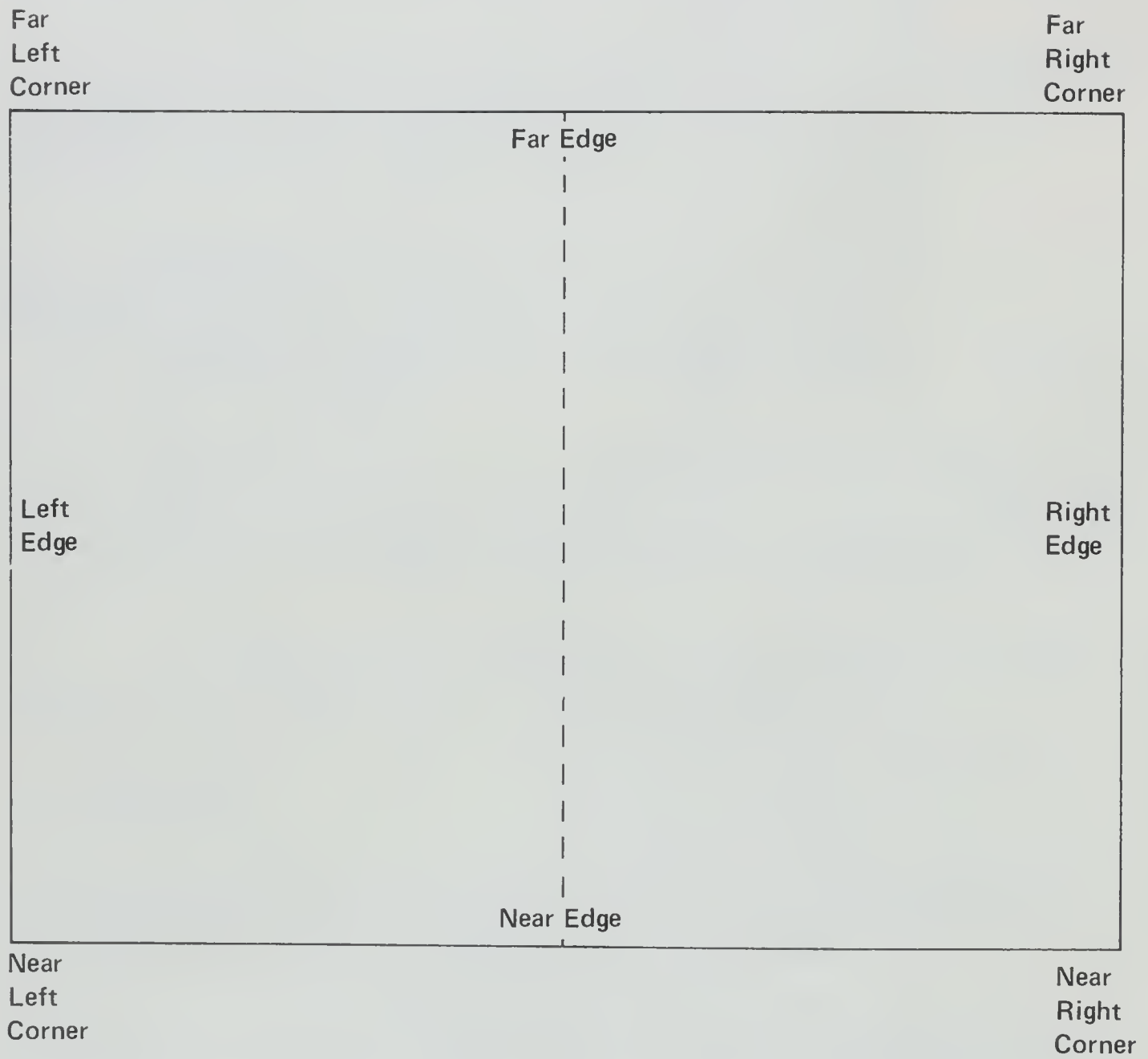
- a. Open the baseboard to its full length and place it in front of the student. (See diagram)
- b. Direct the student to examine the baseboard and identify its shape. Explain to the student that the baseboard is shaped like a rectangle and the fuzzy material on the baseboard is called velcro. Take a piece of velcro and attach it to the baseboard to demonstrate its adhesive quality.
- c. Show the student the left edge of the baseboard. Direct the student to scan the entire length of the left edge. Explain that the edge scanned is called the "left edge of the baseboard."
- d. Repeat the procedure to locate and identify the right edge of the baseboard.
- e. Show the student the near edge of the baseboard. Direct the student to scan the entire length of the near edge. Explain to the student that the edge scanned is called the "near edge" of the baseboard because it's the edge closest to the student.
- f. Repeat the procedure to locate and identify the far edge of the baseboard. Explain to the student that the edge scanned is called the "far edge" of the baseboard because it's the edge farthest from the student.
- g. Correct errors and review.

- h. Direct the student to locate the four corners of the baseboard.
1. Have the student place the left index finger on the far edge of the baseboard and the right index finger on the right edge of the baseboard. Move both fingers (at the same time) and locate the far right corner. Identify the corner as the far right corner.
 2. Have the student place the left index finger on the near edge of the baseboard and the right index finger on the right edge of the baseboard. Move both fingers (at the same time) and locate the near right corner. Identify the corner as the near right corner.
 3. Have the student place the left index finger on the left edge of the baseboard and the right index finger on the far edge of the baseboard. Move both fingers (at the same time) and locate the far left corner. Identify the corner as the far left corner.
 4. Have the student place the left index finger on the left edge of the baseboard and the right index finger on the near edge of the baseboard. Move both fingers (at the same time) and locate the near left corner. Identify the corner as the near left corner.
- i. Correct errors and review.

Evaluation

- a. Ask the student to locate and identify:
1. Near edge of the baseboard
 2. Far edge of the baseboard
 3. Right edge of the baseboard
 4. Left edge of the baseboard
- b. Ask the student to locate and identify:
1. Far right corner of the baseboard
 2. Near right corner of the baseboard
 3. Far left corner of the baseboard
 4. Near left corner of the baseboard

DIAGRAM



Lesson 2: Familiarization with Parallel Lines

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will be able to identify a parallel relationship.
- b. The student will be able to construct a parallel relationship.

Materials

- a. Baseboard
- b. Two rectangles ($4\frac{1}{2}" \times 17\frac{3}{4}"$)
- c. Two rectangles ($\frac{3}{4}" \times 8"$)
- d. Two rectangles ($4\frac{1}{2}" \times 8"$)
- e. One strip ($\frac{1}{2}" \times 2"$)

Procedure

a. Place two rectangles ($17\frac{3}{4}" \times 4\frac{1}{2}"$) parallel to each other near the center of the board. Leave approximately 2" of the board exposed between the parallel edges. (See diagram)

b. Direct the student to examine the velcro area between the two inside edges. Discuss the parallel relationship of the two inside edges; two edges which are equidistant apart and never meet are defined as being parallel.

c. Place the student's left index finger on the inside (right) edge of the left rectangle.

d. Place the student's right index finger on the inside (left) edge of the right rectangle.

e. Ask the student to slide his left index finger along the edge of the left rectangle from the near side to the far side of the board. Repeat procedure for right index finger.

f. Ask the student to reverse the scan by sliding both fingers along the parallel edges to the near side of the board. Now direct the student to move his fingers from the near side to the far side of the board simultaneously.

g. Correct errors and review.

h. Direct the student to construct a set of parallel edges on the workspace next to the example. Have the student use two strips ($\frac{3}{4}$ " x 8") and refer to the sample when constructing the parallel edges. Provide assistance if necessary. (Demonstrate to the student how a 2" strip can be used to check if the two parallel edges are equidistant at all points, e.g., two ends and middle.)

i. Remove all the pieces from the board and direct the student to construct a set of parallel edges. Discuss the parallel relationship.

j. Use other CMK pieces and direct the student to construct parallel relationships.

Evaluation

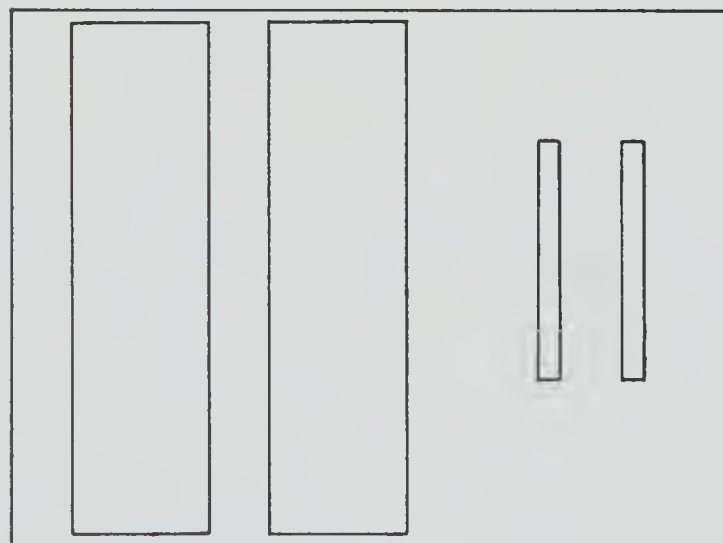
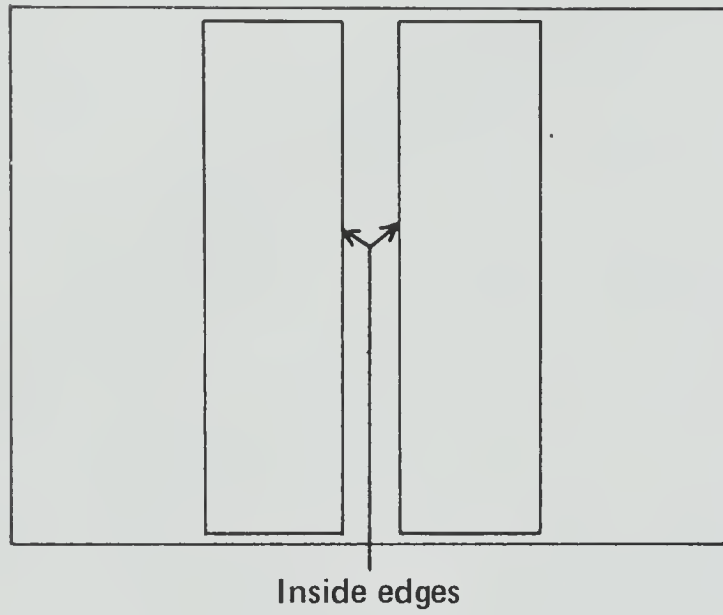
a. Have the student construct several examples of parallel relationships.

1. Construct a parallel relationship using rectangles ($17\frac{3}{4}$ " x $4\frac{1}{2}$ ").
2. Construct a parallel relationship using rectangles ($4\frac{1}{2}$ " x 8").
3. Construct a parallel relationship using rectangles ($\frac{3}{4}$ " x 8").

b. Have the student construct a parallel relationship using 2 rectangles ($\frac{3}{4}$ " x 8").

1. Ask the student to identify the two inside edges which are parallel.
2. Ask the student to locate the area between the two parallel edges.
3. Ask the student to describe the characteristics of a parallel relationship, i.e., two edges equidistant apart which never meet.

DIAGRAM



Lesson 3: Familiarization with Perpendicular Lines

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will be able to identify a perpendicular relationship.
- b. The student will be able to construct perpendicular relationships.

Materials

- a. Baseboard
- b. Two rectangles ($4\frac{1}{2}" \times 8"$)
- c. One rectangle ($4\frac{1}{2}" \times 17\frac{3}{4}"$)

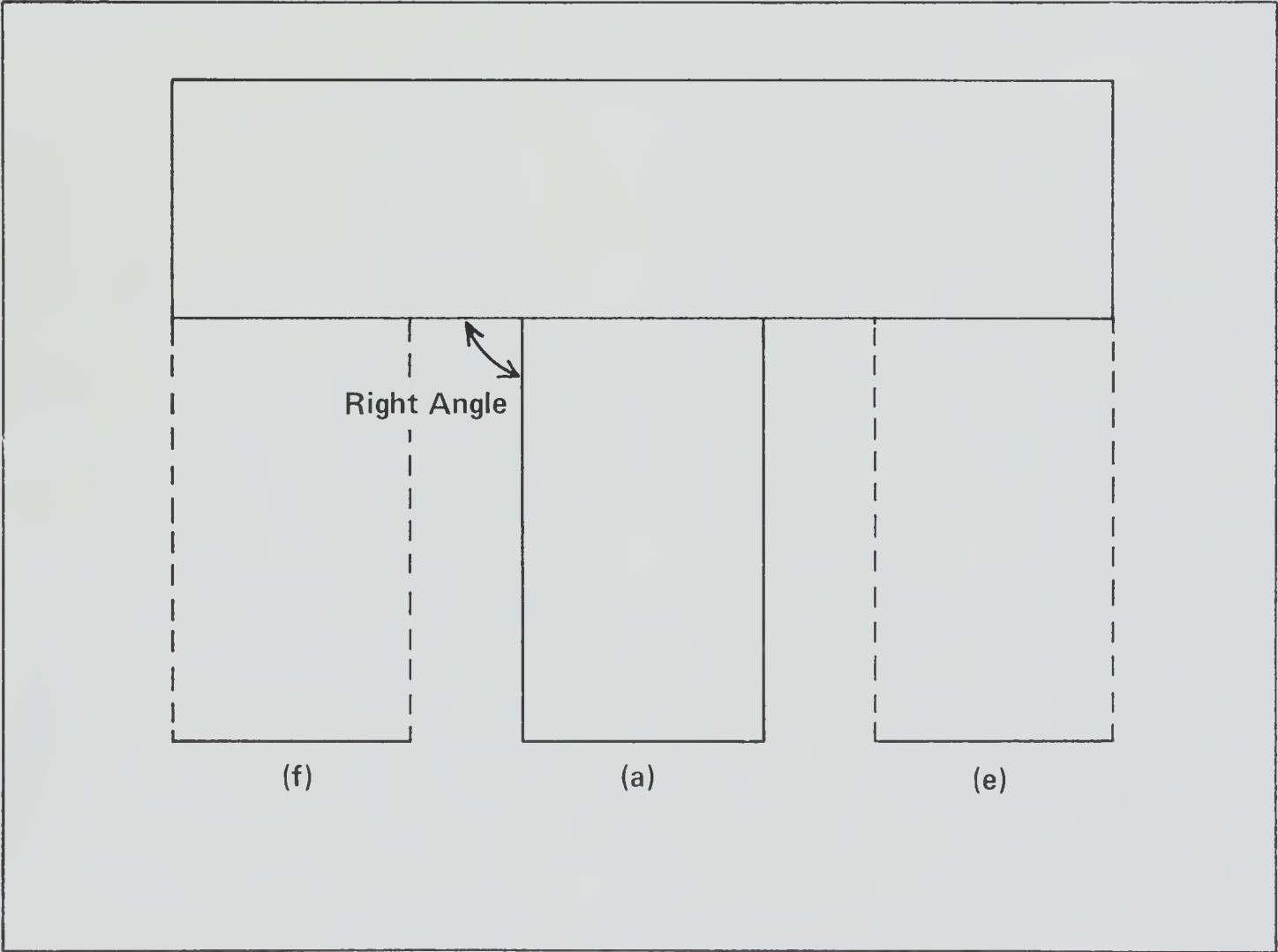
Procedure

- a. Using two rectangles ($4\frac{1}{2}" \times 8"$ and $4\frac{1}{2}" \times 17\frac{3}{4}"$) construct a perpendicular relationship near the center of the baseboard. (See diagram)
- b. Direct the student to examine the perpendicular relationship. Explain to the student that the two strips are perpendicular to each other.
- c. Direct the student to locate the area where the two strips meet.
- d. Show the student the two right angles which are formed. Explain to the student that a perpendicular relationship is formed when one straight line meets another at right angles.
- e. Direct the student to place another rectangle ($4\frac{1}{2}" \times 8"$) at the right end of the horizontal strip. Compare the two constructions. Explain that regardless of placement the strips of each construction are still perpendicular.
- f. Repeat step E moving the second vertical strip to the left end of the horizontal strip. Discuss the perpendicular relationship of the two strips.
- g. Correct errors and review.

Evaluation

- a. Construct a perpendicular relationship and ask the student to identify the two rectangular strips and the right angles.
- b. Ask the student to construct two examples of perpendicular relationships. Use $4\frac{1}{2}" \times 8"$ rectangles.

DIAGRAM



Lesson 4: Familiarization with a City Block

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. Using the baseboard and a rectangle (8" x 11") the student will be able to locate and identify the shape of the piece, four corners, four sides, and the parallel and perpendicular sides.

b. The student will be able to locate and identify the components of a city block represented on a rectangular piece, i.e., four street corners, four sides of a city block, and the relationship of parallel and perpendicular street sides to a city block.

Materials

- a. Baseboard
- b. One rectangle (8" x 11")

Procedure

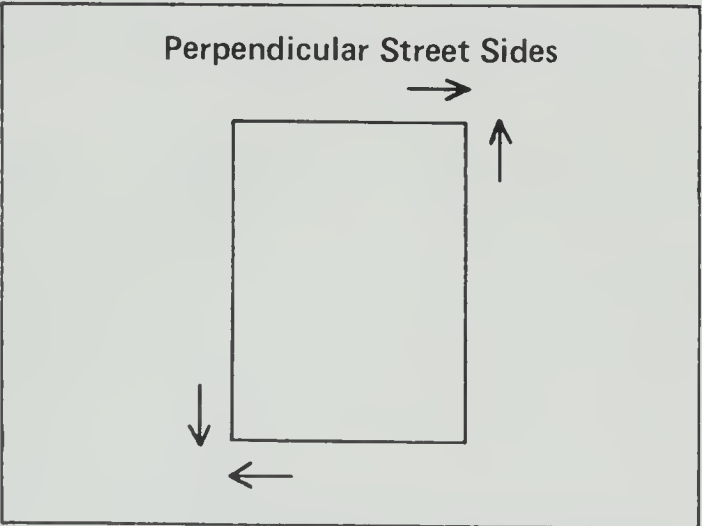
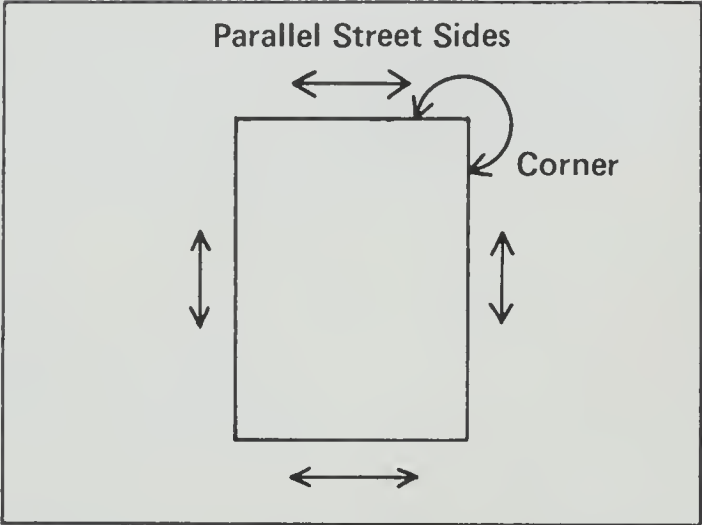
- a. Place the rectangle in the center of the baseboard. (See diagram)
- b. Direct the student to scan the baseboard and locate the rectangle.
- c. Ask the student to identify the shape.
- d. Ask the student to locate the four corners of the rectangle. (Place hands)
- e. Ask the student to identify the parallel and perpendicular sides of the rectangle. (Place hands)
- f. Describe and indicate which parts of the rectangle represent the parts of the city block.
 - 1. Four street corners
 - 2. Four street sides
 - 3. Parallel and perpendicular street sides
- g. Correct errors and review.

Evaluation

a. Ask the student to identify and locate all the component parts of a city block represented on the rectangle.

1. Four corners
2. Parallel street sides
3. Perpendicular street sides

DIAGRAM



Lesson 5: Familiarization with a Standard Intersection; Identifying Four Blocks and Two Streets

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will identify the component parts of an intersection.
 1. Four blocks
 2. Two streets

Materials

- a. Baseboard
- b. Four rectangles (8" x 11")

Procedure

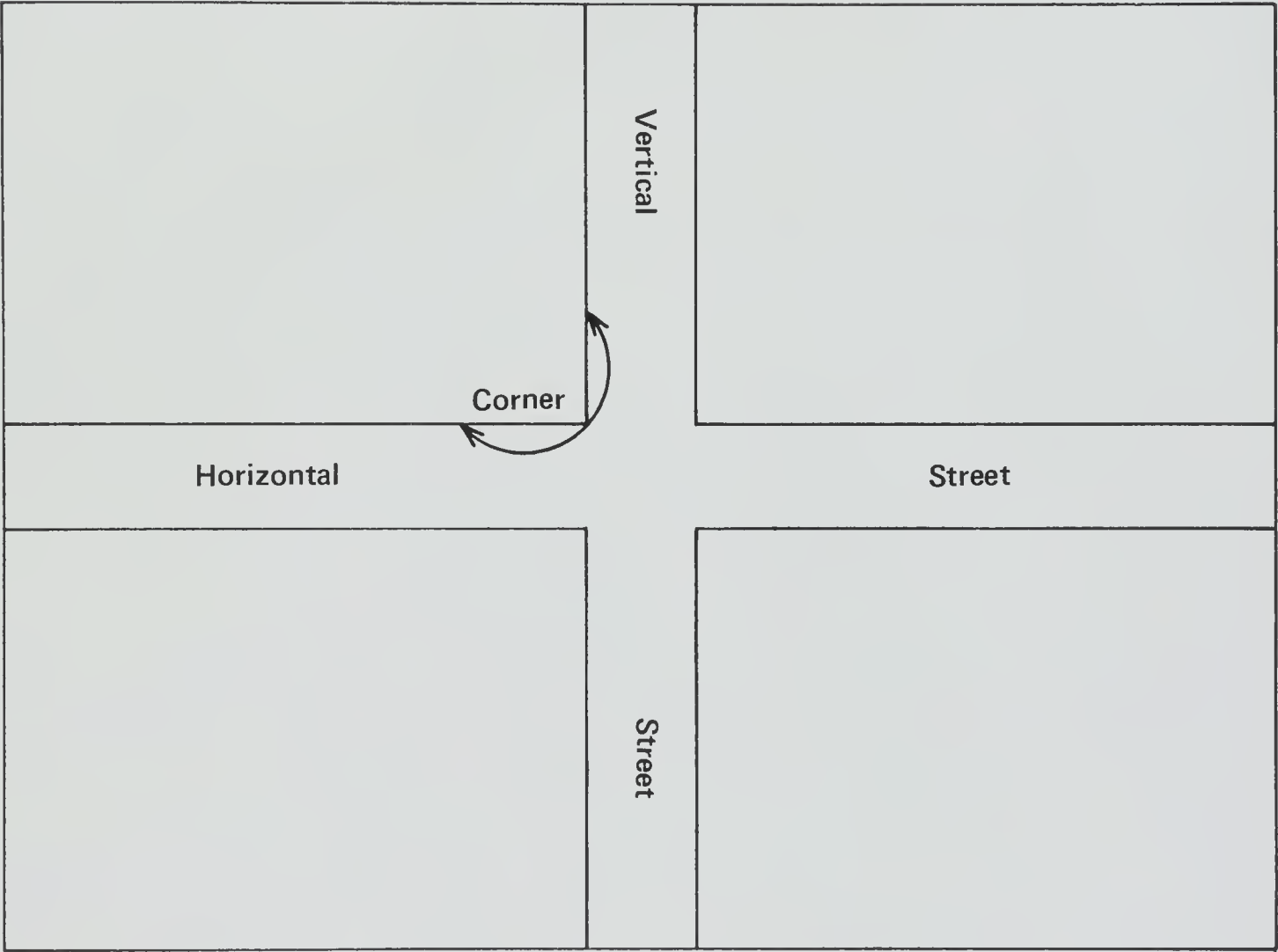
- a. Construct a standard intersection on the baseboard. (See diagram)
 1. Designate the long street as the horizontal street.
 2. Designate the short street as the vertical street.
- b. Direct the student to examine the representation of the intersection. (Place hands.) Have the student remove the rectangles from the board and reconstruct the intersection.
- c. Correct errors and review.
- d. Show the student the flannel area which represents the horizontal street. Direct the student to scan the horizontal street.
- e. Show the student the flannel area which represents the vertical street. Direct the student to scan the vertical street.
- f. Show the student the four rectangulars which represent each of the four blocks.
- g. Direct the student to locate and identify the horizontal and vertical streets composing the standard intersection.
- h. Direct the student to locate and count the number of blocks represented in the standard intersection.

- i. Correct errors and review.

Evaluation

- a. Ask the student to construct a standard intersection.
- b. Ask the student to locate and identify the horizontal and vertical streets.
- c. Ask the student to count the four blocks.

DIAGRAM



Lesson 6: Familiarization with a Standard Intersection; Demonstrating how a Vertical Street Intersects with a Horizontal Street

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will demonstrate how two streets of a standard intersection intersect.

Materials

- a. Baseboard
- b. Four rectangles (8" x 11")

Procedure

a. Construct a standard intersection on the baseboard. (See diagram)

- 1. Designate the long street as the horizontal street.
- 2. Designate the short street as the vertical street.

b. Direct the student to locate the near end of the vertical street and scan the street by moving both hands from the near end to the far end of the vertical street. Reverse the scan by moving hands from the far end to the near end of the vertical street.

c. Direct the student to locate the left end of the horizontal street and scan the street by moving both hands from the left end to the right end of the horizontal street. Reverse the scan by moving hands from the right end to the left end of the horizontal street.

d. Demonstrate how the two streets intersect by directing the student to place the right hand on the near end of the vertical street and the left hand on the left end of the horizontal street. Have the student move both hands at the same time toward the intersection until both hands meet. Pause while hands are touching. Have the student continue moving hands toward opposite end of vertical and horizontal streets. Explain to the student that the area where the hands meet is the intersection of the two streets.

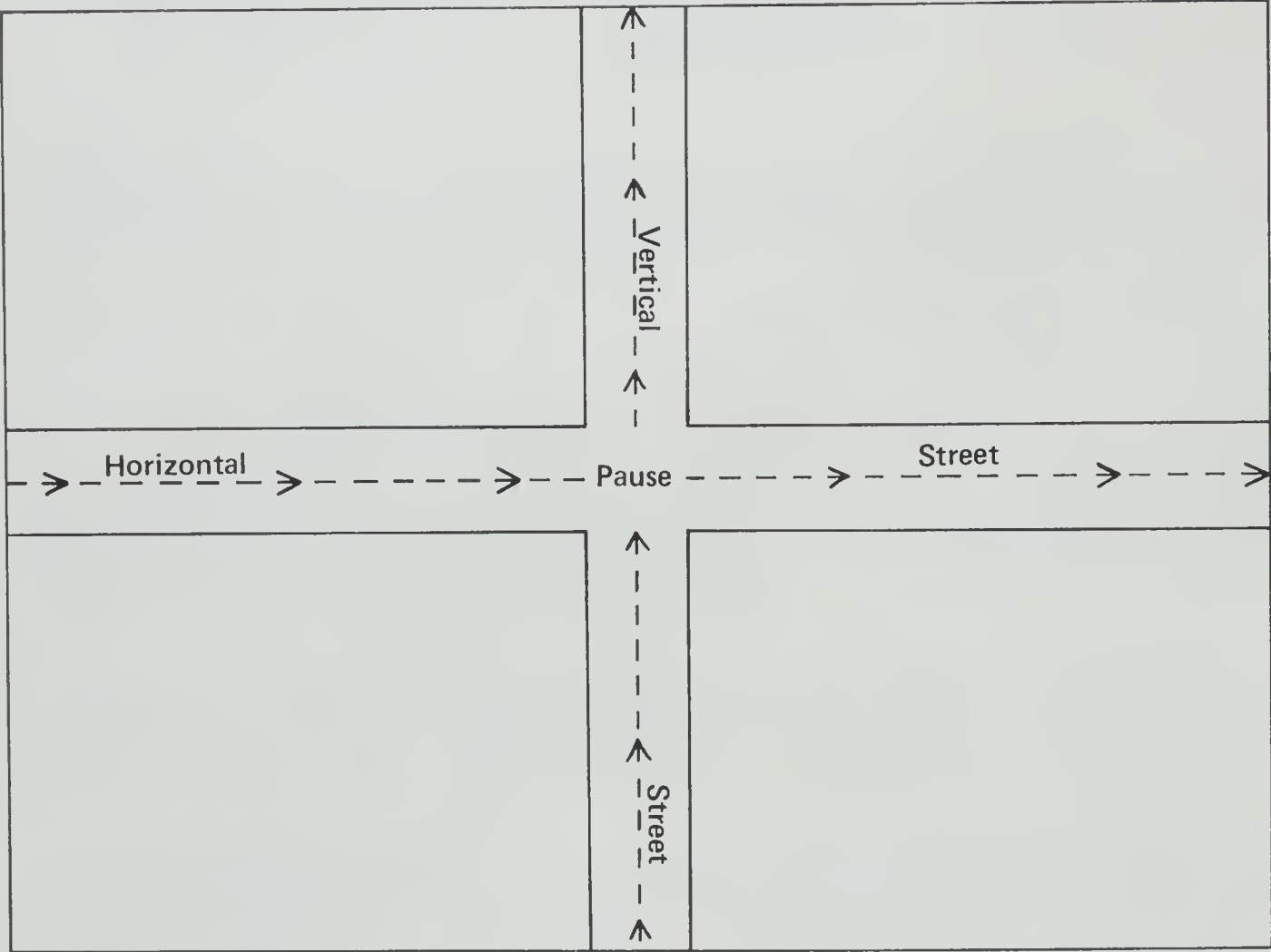
e. Direct the student to continue to experiment in identifying how the two streets intersect.

1. Place the right hand at the right end of the horizontal street and the left hand at the near end of the vertical street. Have the student move both hands at the same time toward the intersection until both hands meet. Pause while hands are touching. Have the student continue moving hands toward opposite end of the vertical and horizontal streets.
2. Repeat the procedure by placing the right hand on the right end of the horizontal street and the left hand at the far end of the vertical street.
3. Repeat the procedure by placing the right hand at the far end of the vertical street and the left hand at the left end of the horizontal street.

Evaluation

- a. Ask the student to demonstrate two methods of showing how two streets intersect.

DIAGRAM



Lesson 7: Familiarization with a Standard Intersection; Identifying the Left and Right Edge/ Side/Curb of a Vertical Street and the Near and Far Edge/Side/Curb of a Horizontal Street

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will identify the left and right edge/side/curb of the vertical street and the near and far edge/side/curb of the horizontal street.

Materials

- a. Baseboard
- b. Four large rectangles (8" x 11")

Procedure

- a. Ask the student to construct a standard intersection on the baseboard. (See diagram)
 - 1. Designate the long street as the horizontal street.
 - 2. Designate the short street as the vertical street.
- b. Have the student locate the near end of the vertical street. Show the student the area which represents the right and left edge/side/curb.
- c. Direct the student to place index fingers against the right and left edge/side/curb of the vertical street.
- d. Instruct the student to move his fingers (at the same time) toward the intersection and stop at the intersection. Explain to the student that the area touched is the right and left edge/side/curb of the vertical street.
- e. Repeat the same procedure beginning at the far end of the vertical street, moving fingers toward the intersection.
- f. Correct errors and review.
- g. Have the student locate the left end of the horizontal street. Show the student the area which represents the near and far edge/side/curb.
- h. Direct the student to place the index fingers against the near and far edge/side/curb of the horizontal street.

i. Instruct the student to move his fingers (at the same time) toward the intersection and stop at the intersection. Explain to the student that the area touched is the near and far edge/side/curb of the horizontal street.

j. Repeat the same procedure beginning at the right end of the horizontal street, moving the index fingers toward the intersection.

k. Correct errors and review.

Evaluation

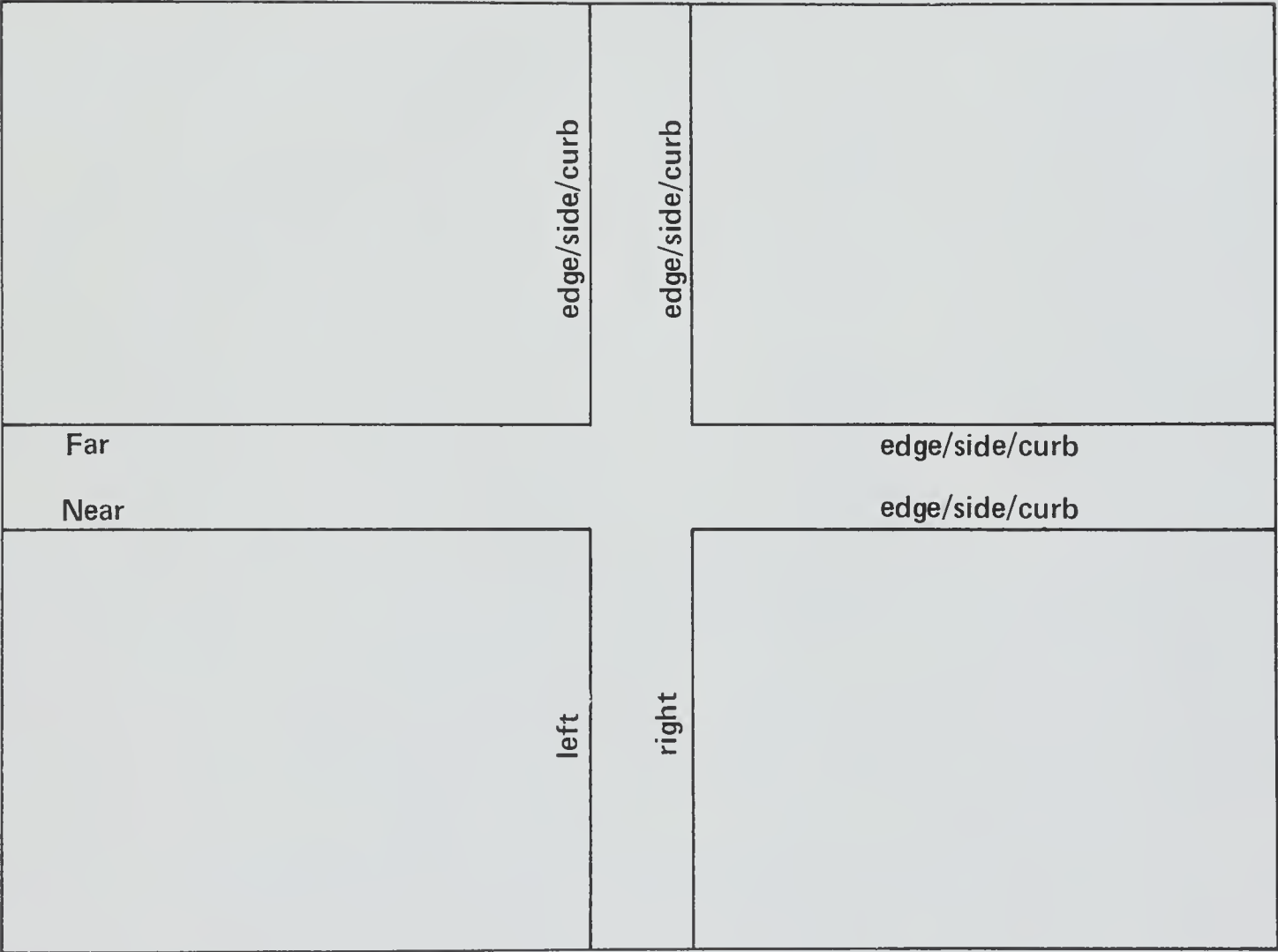
a. Ask the student to identify the left edge/side/curb of the vertical street.

b. Ask the student to identify the near edge/side/curb of the horizontal street.

c. Ask the student to identify the right edge/side/curb of the vertical street.

d. Ask the student to identify the far edge/side/curb of the horizontal street.

DIAGRAM



Lesson 8: Familiarization with a Standard Intersection; Identifying the Four Corners of an Intersection

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will locate the four corners of a standard intersection.
- b. The student will associate the following terms with the four corners of a standard intersection.
 1. Far left corner
 2. Far right corner
 3. Near left corner
 4. Near right corner

Materials

- a. Baseboard
- b. Four rectangles (8" x 11")

Procedure

- a. Direct the student to construct a standard intersection on the baseboard. (See diagram)
 1. Designate the long street as the horizontal street.
 2. Designate the short street as the vertical street.
- b. Direct the student to locate the left end of the horizontal street and place the left index finger against the far edge/side/curb.
- c. Direct the student to locate the far end of the vertical street and place the right index finger against the left edge/side/curb.
- d. Direct the student to move both index fingers (at the same time) toward the intersection and locate the far left corner of the intersection.
- e. Correct errors and review.

f. Explain to the student that the area located is the far left corner of the intersection.

g. Repeat the procedure and locate the far right corner of the intersection.

h. Direct the student to locate the left end of the horizontal street and place the left index finger against the near edge/side/curb.

i. Direct the student to locate the near end of the vertical street and place the right index finger against the left edge/side/curb.

j. Direct the student to move both index fingers (at the same time) toward the intersection and locate the near left corner of the intersection.

k. Explain to the student that the area located is the near left corner of the intersection.

l. Correct errors and review.

m. Repeat the same procedure and locate the near right corner of the intersection.

Evaluation

a. Ask student to locate the four corners of the intersection and identify the name of each corner.

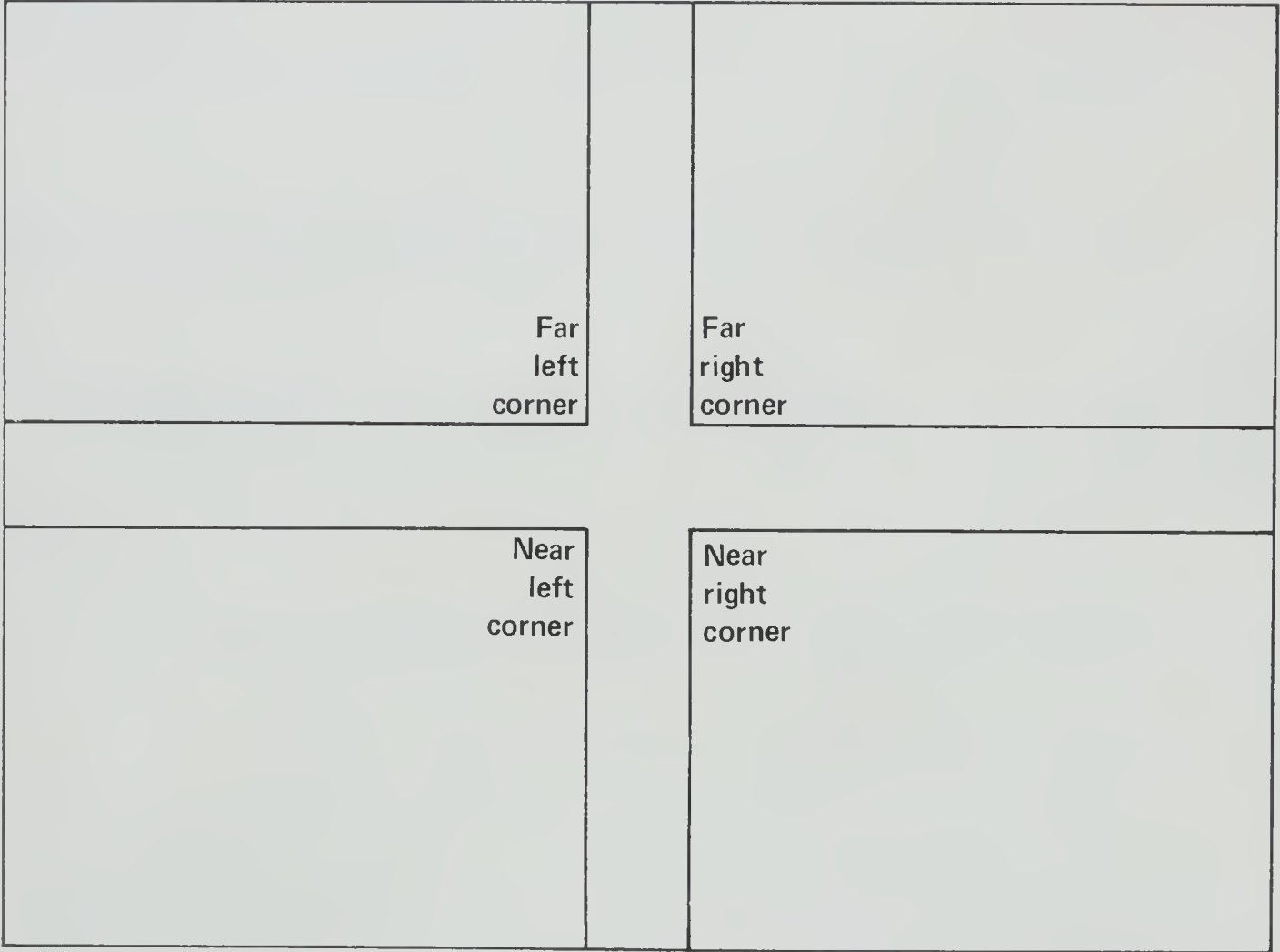
1. Far left corner

2. Far right corner

3. Near left corner

4. Near right corner

DIAGRAM



Lesson 9: Associating Cardinal Directions with each Edge of the CMK Baseboard

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will identify and associate a cardinal direction with each edge of the baseboard.

Materials

a. Baseboard

Procedure

a. Begin with the baseboard. (See diagram)

b. Have the student locate the far edge of the baseboard.

c. Explain to the student that the far edge of the baseboard represents North.

d. Have the student locate the near edge of the baseboard.

e. Explain to the student that the near edge of the baseboard represents South.

f. Have the student locate the North and South edges of the baseboard.

g. Correct errors and review.

h. Have the student locate the left edge of the baseboard.

i. Explain to the student that the left edge of the baseboard represents West.

j. Have the student locate the right edge of the baseboard.

k. Explain to the student that the right edge of the baseboard represents East.

l. Have the student locate the East and West edges of the baseboard.

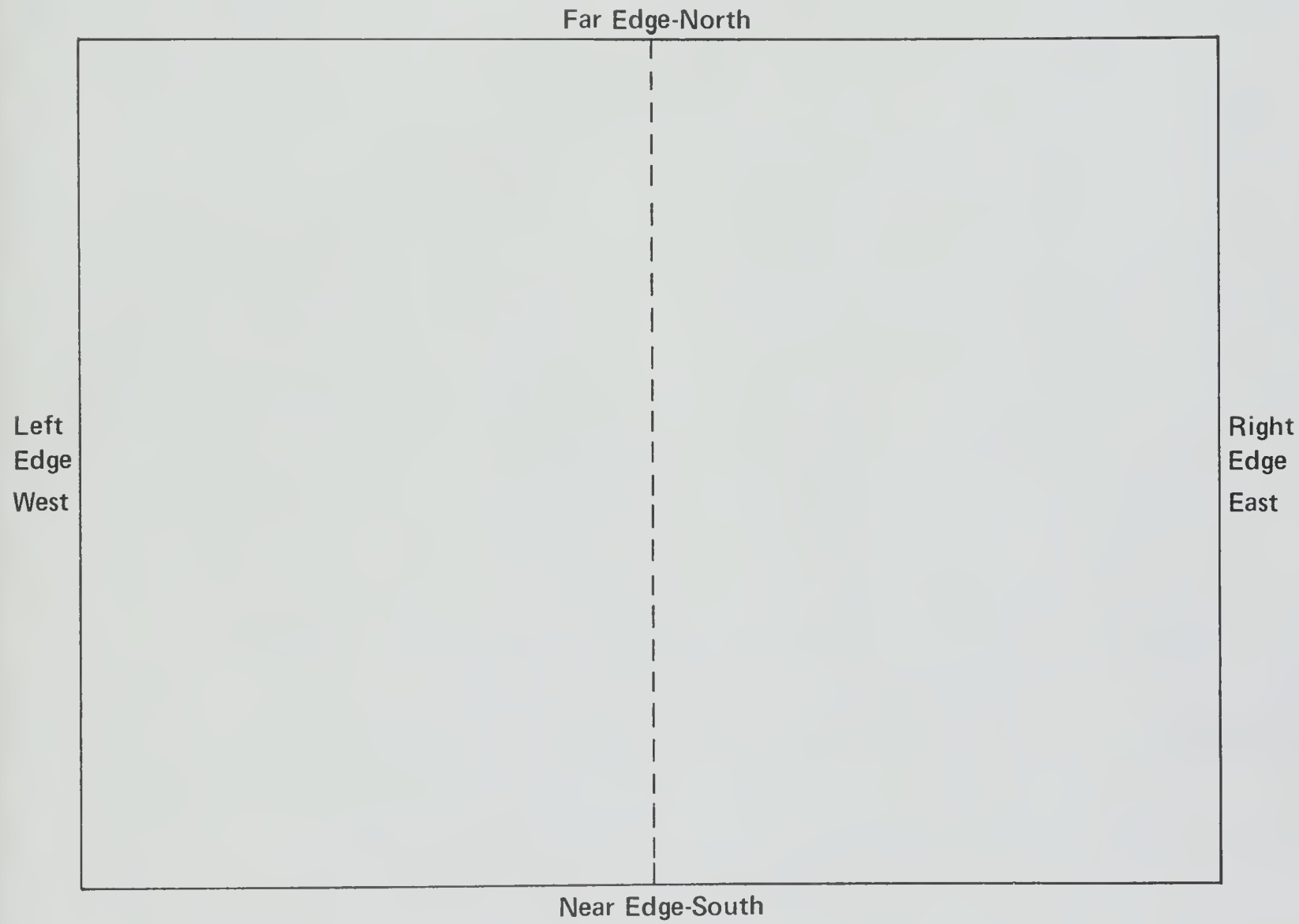
m. Have the student locate the North and South edges of the baseboard.

n. Correct errors and review.

Evaluation

- a. Ask the student to locate the North, South, East, and West edges of the baseboard.

DIAGRAM



Lesson 10: Associating Cardinal Directions with each Corner of the CMK Baseboard

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will identify and associate a cardinal direction with each corner of the CMK Baseboard.

Materials

a. Baseboard

Procedure

a. Begin with the baseboard. (See diagram)

Have the student identify:

1. Far edge of the baseboard as North
2. Near edge of the baseboard as South
3. Left edge of the baseboard as West
4. Right edge of the baseboard as East

b. Correct errors and review.

c. Direct the student to place the left index finger on the far edge of the baseboard by the far left corner.

d. Direct the student to place the right index finger on the right edge of the baseboard by the near right corner.

e. Direct the student to move both index fingers (at the same time) to the far right corner.

f. Explain to the student that the corner located is the northeast corner.

g. Correct errors and review.

h. Direct the student to place left index finger on the left edge of the baseboard by the near left corner.

i. Direct the student to place the right index finger on the far edge of the baseboard by the far right corner.

j. Direct the student to move both index fingers (at the same time) to far left corner.

k. Explain to the student that the corner located is the northwest corner.

l. Correct errors and review.

m. Direct the student to place the left index finger on the left edge of the baseboard by the far left corner.

n. Direct the student to place the right index finger on the near edge of the baseboard by the near right corner.

o. Direct the student to move both index fingers (at the same time) to the near left corner.

p. Explain to the student that the corner located is the southwest corner.

q. Correct errors and review.

r. Direct the student to place the left index finger on the near edge of the baseboard by the near left corner.

s. Direct the student to place the right index finger on the right edge of the baseboard by the far right corner.

t. Direct the student to move both index fingers (at the same time) to the near right corner.

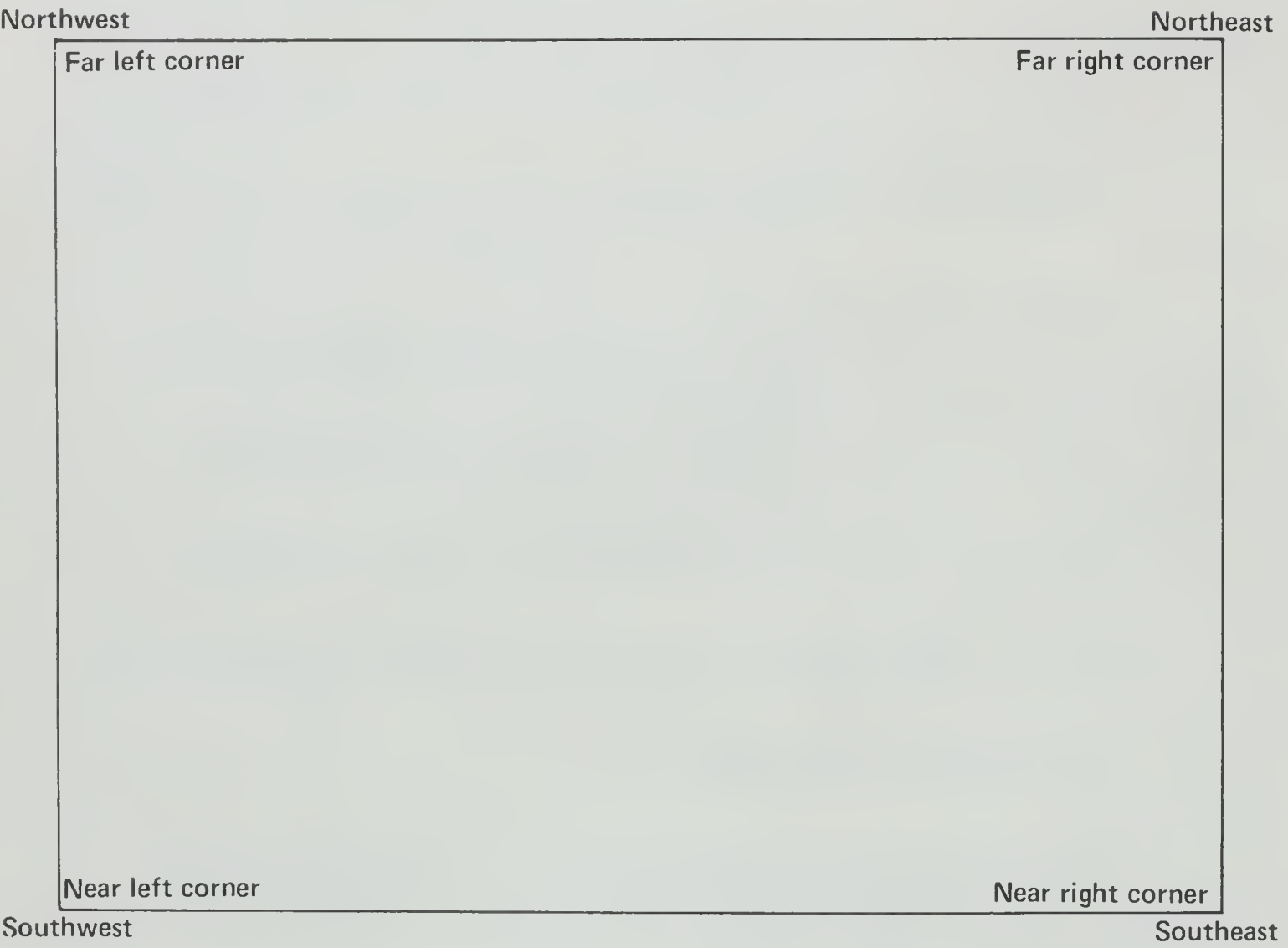
u. Explain to the student that the corner located is the southeast corner.

v. Correct errors and review.

Evaluation

a. Ask the student to identify and locate the northwest corner, southwest corner, northeast corner, and the southeast corner of the baseboard.

DIAGRAM



Lesson 11: Associating Cardinal Directions with Intersecting Streets

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will be able to locate the north and south end of the vertical street and the east and west end of the horizontal street.
- b. The student will be able to locate the east and west edge/side/curb of the vertical street and the north and south edge/side/curb of the horizontal street.

Materials

- a. Baseboard
- b. Four rectangles (8" x 11")

Procedure

- a. Direct the student to construct a standard intersection on the baseboard. (See diagram)
 1. Designate the short vertical street as the north/south street.
 2. Designate the long horizontal street as the east/west street.
- b. Direct the student to examine the intersection and locate two streets, four blocks, and the four corners of the intersection.
- c. Correct errors and review.
- d. Direct the student to scan the vertical street. (Place hands if student is unable to locate vertical street.) Designate the far end of the vertical street as north and the near end of the vertical street as south.
- e. Direct the student to locate and identify the north and south ends of the vertical street.
- f. Correct errors and review.
- g. Direct the student to scan the horizontal street. (Place hands if the student is unable to locate the horizontal street.) Designate the left end of the horizontal street as west and the right end of the horizontal street as east.

h. Direct the student to locate and identify the west and east ends of the horizontal street.

i. Correct errors and review.

j. Direct the student to locate the left edge/side/curb of the vertical street and scan from north to south. (Place hands if necessary.) Designate the area scanned as the west edge/side/curb of the vertical street.

k. Direct the student to locate and identify the west edge/side/curb of the vertical street.

l. Correct errors and review.

m. Repeat the procedure for identifying the east edge/side/curb of the vertical street.

n. Direct the student to locate the far edge/side/curb of the horizontal street and scan from west to east (Place hands if necessary). Designate the area scanned as the north edge/side/curb of the horizontal street.

o. Direct the student to locate and identify the north edge/side/curb of the horizontal street.

p. Correct errors and review.

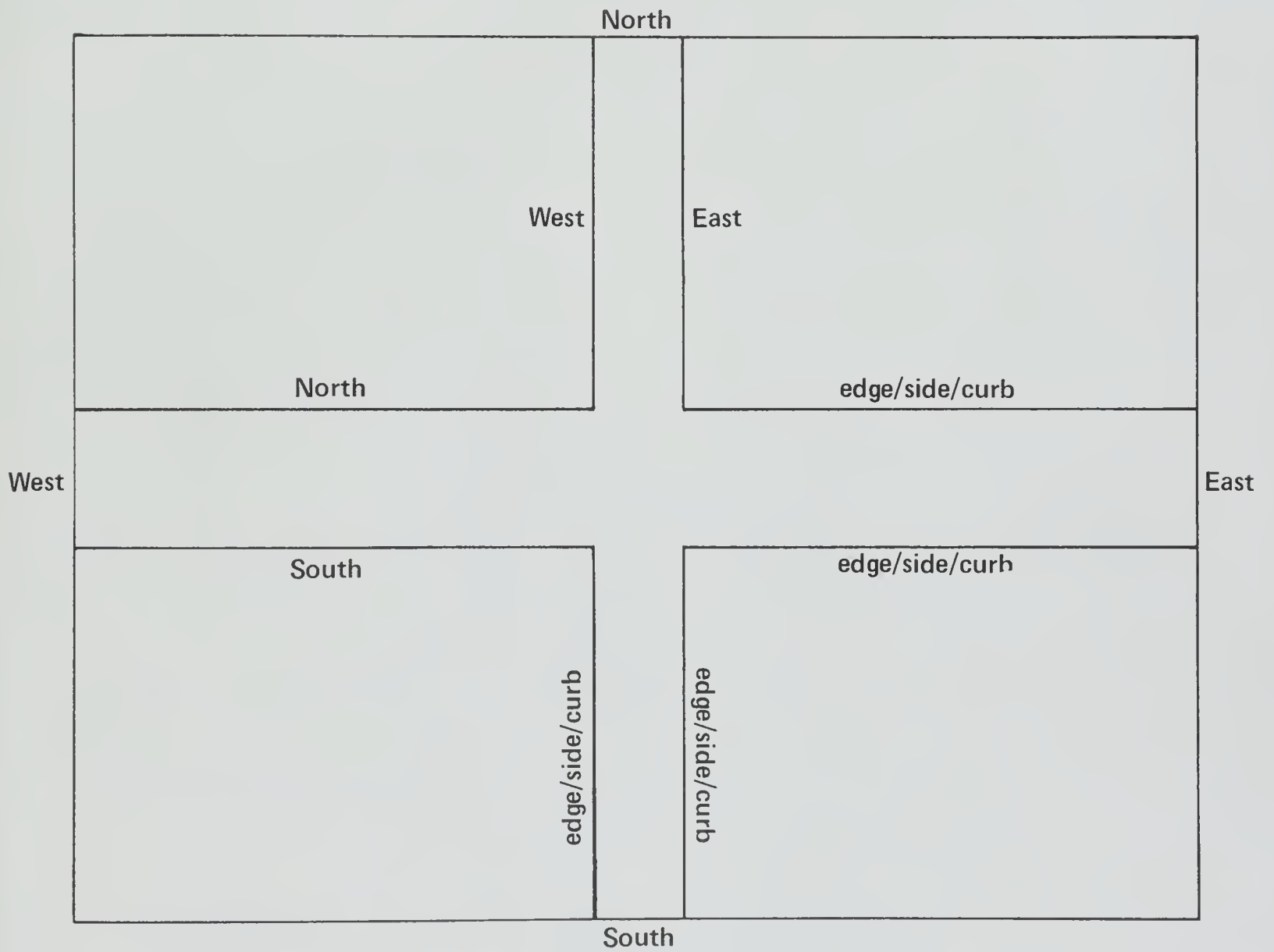
q. Repeat the procedure for identifying the south edge/side/curb of the horizontal street.

Evaluation

a. Ask the student to locate the north and south ends of the vertical street and the west and east ends of the horizontal street.

b. Ask the student to locate the west and east edge/side/curb of the vertical street and the north and south edge/side/curb of the horizontal street.

DIAGRAM



Lesson 12: Associating Cardinal Directions with the Four Corners of a Standard Intersection

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will be able to associate a cardinal direction with each corner of a standard intersection.

b. The student will be able to locate and identify the northwest, northeast, southwest, and southeast corners of a standard intersection.

Materials

a. Baseboard

b. Four rectangles (8" x 11")

Procedure

a. Direct the student to construct a standard intersection on the baseboard. (See diagram)

1. Designate the short vertical street as the north/south street.

2. Designate the long horizontal street as the east/west street.

b. Direct the student to locate the far end of the vertical street and place the right index finger on the west edge/side/curb.

c. Direct the student to locate the left end of the horizontal street and place the left index finger on the north edge/side/curb.

d. Direct the student to move both index fingers (at the same time) toward the intersection and locate the far left corner of the intersection.

e. Explain to the student that the corner located is the northwest corner of the intersection.

f. Correct errors and review.

g. Repeat the procedure and locate the northeast corner of the intersection.

h. Direct the student to locate the left end of the horizontal street and place the left index finger on the south edge/side/curb.

i. Direct the student to locate the near end of the vertical street and place the right index finger against the west edge/side/curb.

j. Move both index fingers (at the same time) toward the intersection and locate the near left corner of the intersection.

k. Explain to the student that the corner located is the southwest corner of the intersection.

l. Correct errors and review.

m. Repeat the procedure and locate the southeast corner of the intersection.

Evaluation

a. Ask the student to locate the four corners of the intersection and associate a cardinal direction with each corner.

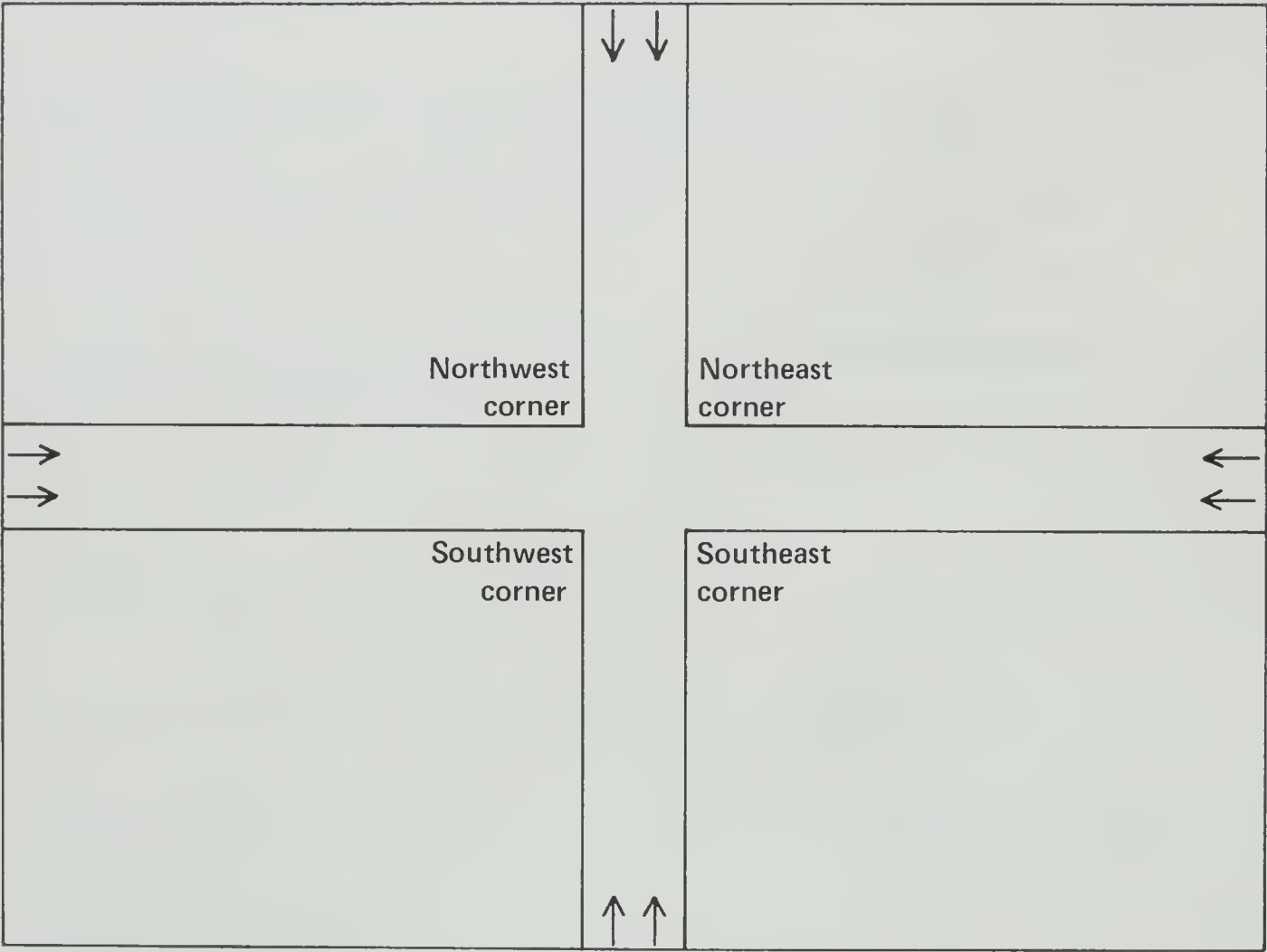
1. Northwest corner

2. Northeast corner

3. Southwest corner

4. Southeast corner

DIAGRAM



Place index fingers on edges where
arrows are located.

Lesson 13: Demonstrating Traffic Movement on 2-Way Streets

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will be able to demonstrate traffic movement on a 2-way street.

1. North-South movement

2. East-West movement

Materials

a. Baseboard

b. Four rectangles (8" x 11")

c. Two model cars

Procedure

a. Direct the student to construct a standard intersection.

1. Designate the long street as the horizontal street.

2. Designate the short street as the vertical street.

b. Direct the student to tactually inspect the model car.

1. Identify the front of the car.

2. Identify the rear of the car.

c. Direct the student to identify the north, south, east, and west edges of the baseboard.

d. Direct the student to place one car at the south end of the vertical street near the east edge/side/curb facing north.

e. Direct the student to leave his chair and move to the north side of the baseboard. Place a car at the north end of the vertical street near the west edge/side/curb facing south.

f. Direct the student to return to his chair. (south edge of the baseboard)

g. Direct the student to locate the car at the far north end of the vertical street with the left hand. Locate the car at the near south end of the vertical street with the right hand.

h. Instruct the student to move both cars toward the intersection. Allow the cars to pass each other and stop at the edges of the baseboard. (See diagram)

i. Explain to the student that traffic moves in two directions on a 2-way street but the cars do not normally collide because each car remains on its right side of the street.

j. Direct the student to demonstrate north-south traffic movement on a 2-way street.

k. Correct errors and review.

l. Direct the student to place one car at the west end of the horizontal street by the near edge/side/curb facing east.

m. Direct the student to place the other car at the east end of the horizontal street by the far edge/side/curb facing west.

n. Instruct the student to move both cars toward the intersection. Allow the cars to pass each other and stop at the edges of the baseboard. (See diagram)

o. Explain to the student that traffic moves in two directions on a 2-way street, but the cars do not normally collide because each car remains on its right side of the street.

p. Direct the student to demonstrate east-west traffic movement on a 2-way street.

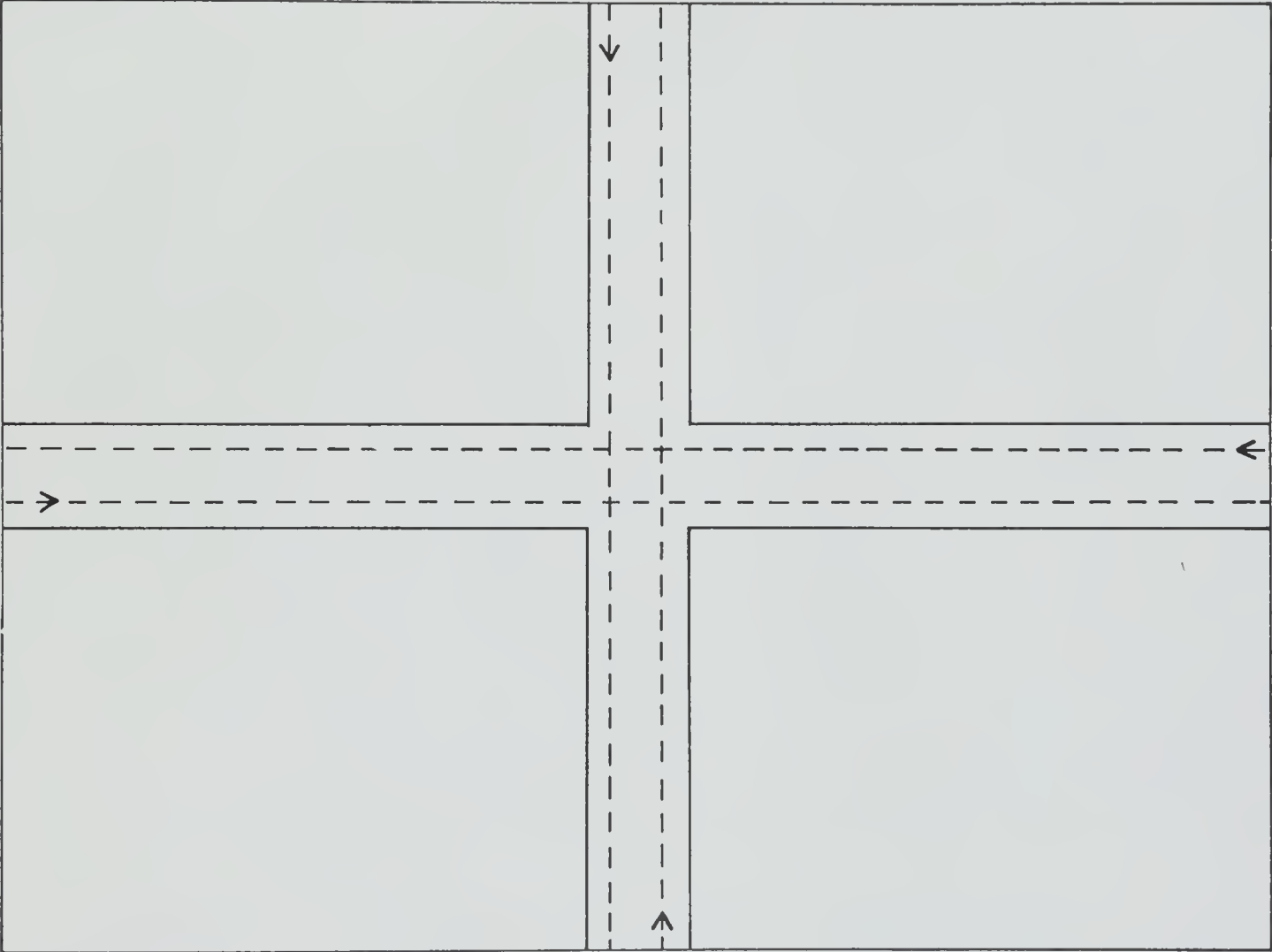
q. Correct errors and review.

Evaluation

a. Ask the student to demonstrate north-south traffic movement on the vertical street.

b. Ask the student to demonstrate east-west traffic movement on the horizontal street.

DIAGRAM



Lesson 14: Demonstrating Traffic Movement on 2-way streets; Making Left & Right Turns

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will be able to demonstrate left and right turns of traffic on a 2-way street.

Materials

- a. Baseboard
- b. Four rectangular pieces (8" x 11")
- c. One model car

Procedure

a. Direct the student to construct a standard intersection.
(See diagram)

1. Designate the long street as the horizontal street.

2. Designate the short street as the vertical street.

b. Direct the student to tactually inspect the model car.

1. Identify the front of the car.

2. Identify the rear of the car.

c. Direct the student to place one car at the south end of the vertical street near the east edge/side/curb facing north.

d. Instruct the student to move the car toward the intersection and turn right (east) onto the horizontal street. (Remind the student to keep the car on its right side of the street after turning.) Proceed to the east end of the horizontal street.

e. Ask the student to demonstrate a right turn by repeating steps c and d.

f. Correct errors and review.

g. Direct the student to place one car at the south end of the vertical street near the east edge/side/curb facing north. (Remind student that the car is placed on its right side of the street.)

h. Instruct the student to move the car toward the intersection and turn left (west) onto the horizontal street. (Remind the student to keep the car on its right side of the street after turning.) Proceed to the west end of the horizontal street.

i. Ask the student to demonstrate a left turn by repeating steps g and h.

*Note:

If the student executes the left turn too sharply, place another car at the southwest corner facing east on the horizontal street. This will cause the student to make a wider turn.

j. Correct errors and review.

k. Repeat the procedure by instructing the student to make left and right turns from the north end of the vertical street and the west and east ends of the horizontal street. (If the student has difficulty demonstrating the turns, have the student move to the different sides of the baseboard and execute the turns.)

Evaluation

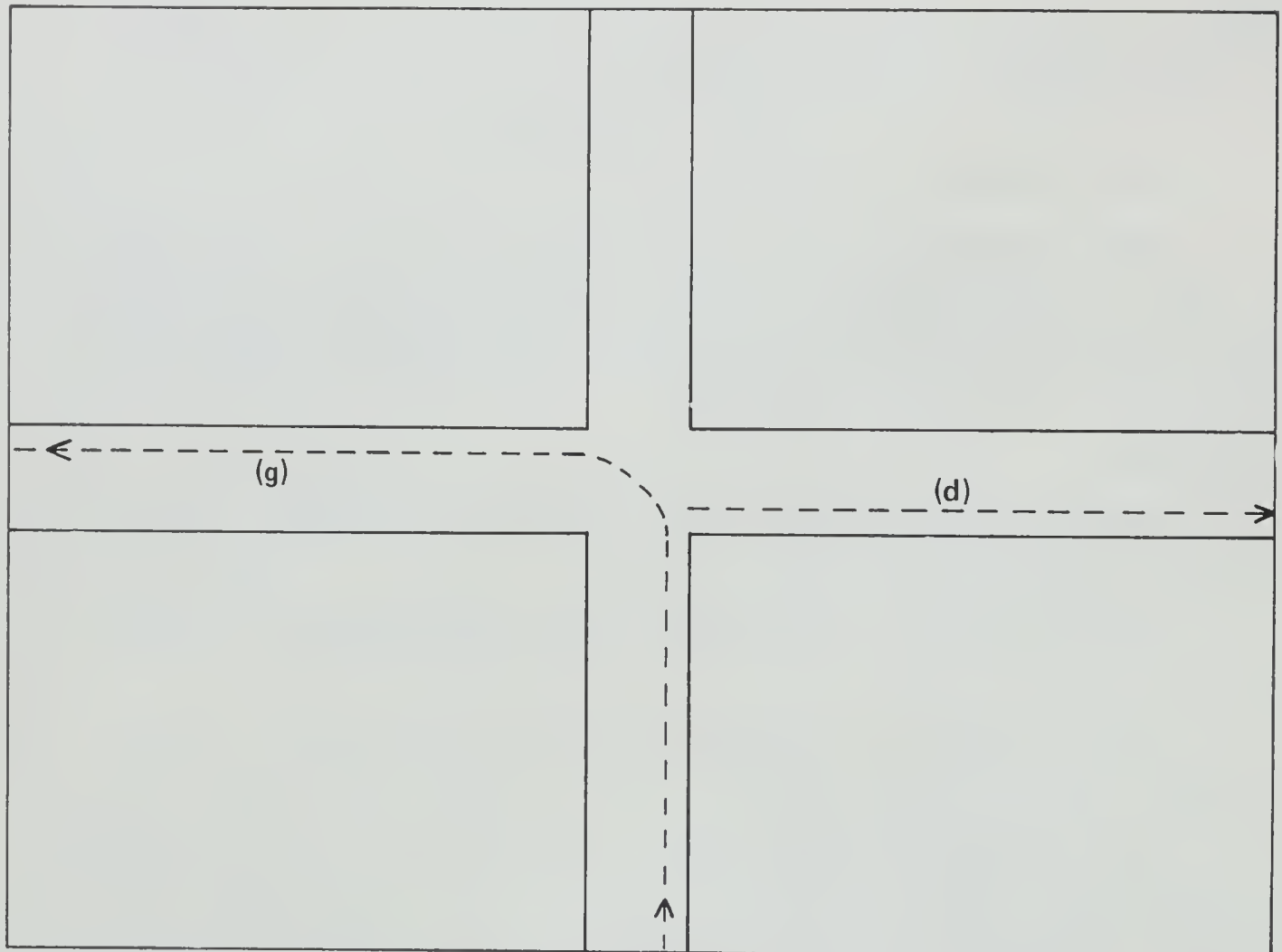
a. Ask the student to demonstrate a left and right turn from the south end of the vertical street.

b. Ask the student to demonstrate a left and right turn from the west end of the horizontal street.

c. Ask the student to demonstrate a left and right turn from the east end of the horizontal street.

d. Ask the student to demonstrate a left and right turn from the north end of the vertical street.

DIAGRAM



Making a right and left turn

Lesson 15: Demonstrating Traffic Movement on One-Way Streets

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

a. The student will be able to demonstrate traffic movement on a one-way street.

Materials

- a. Baseboard
- b. Four rectangular pieces (8" x 11")
- c. Two model cars

Procedure

a. Direct the student to construct a standard intersection.
(See diagram)

- 1. Designate the long street as the horizontal street.
- 2. Designate the short street as the vertical street.

b. Direct the student to tactually inspect the model cars.

- 1. Identify the front of the car.
- 2. Identify the rear of the car.

c. Direct the student to place two cars at the south end of the vertical street. Place one car on the left edge/side/curb of the vertical street and one car on the right edge/side/curb of the vertical street. Both cars should be facing north. Guide the student's hands to the north end of the vertical street explaining and demonstrating that traffic movement on a one-way street is only in one direction.

d. Repeat the procedure having the student demonstrate northerly movement of traffic on a one-way street.

e. Correct errors and review.

f. Direct the student to place the cars at the west end of the horizontal street. Place one car on the far edge/side/curb of the horizontal street and one car on the near edge/side/curb of the horizontal street. Both cars should be facing east. Guide the student's hands to the east end of the horizontal street, explaining and demonstrating that traffic movement on a one-way street is only in one direction.

g. Repeat the procedure having the student demonstrate eastward traffic movement on a one-way street.

h. Correct errors and review.

i. Repeat steps c & d to demonstrate southerly traffic movement on the vertical street. Explain and demonstrate that traffic movement on a one-way street is only in one direction.

j. Repeat steps f & g to demonstrate westward traffic movement on the horizontal street. Explain and demonstrate that traffic movement on a one-way street is only in one direction.

Evaluation

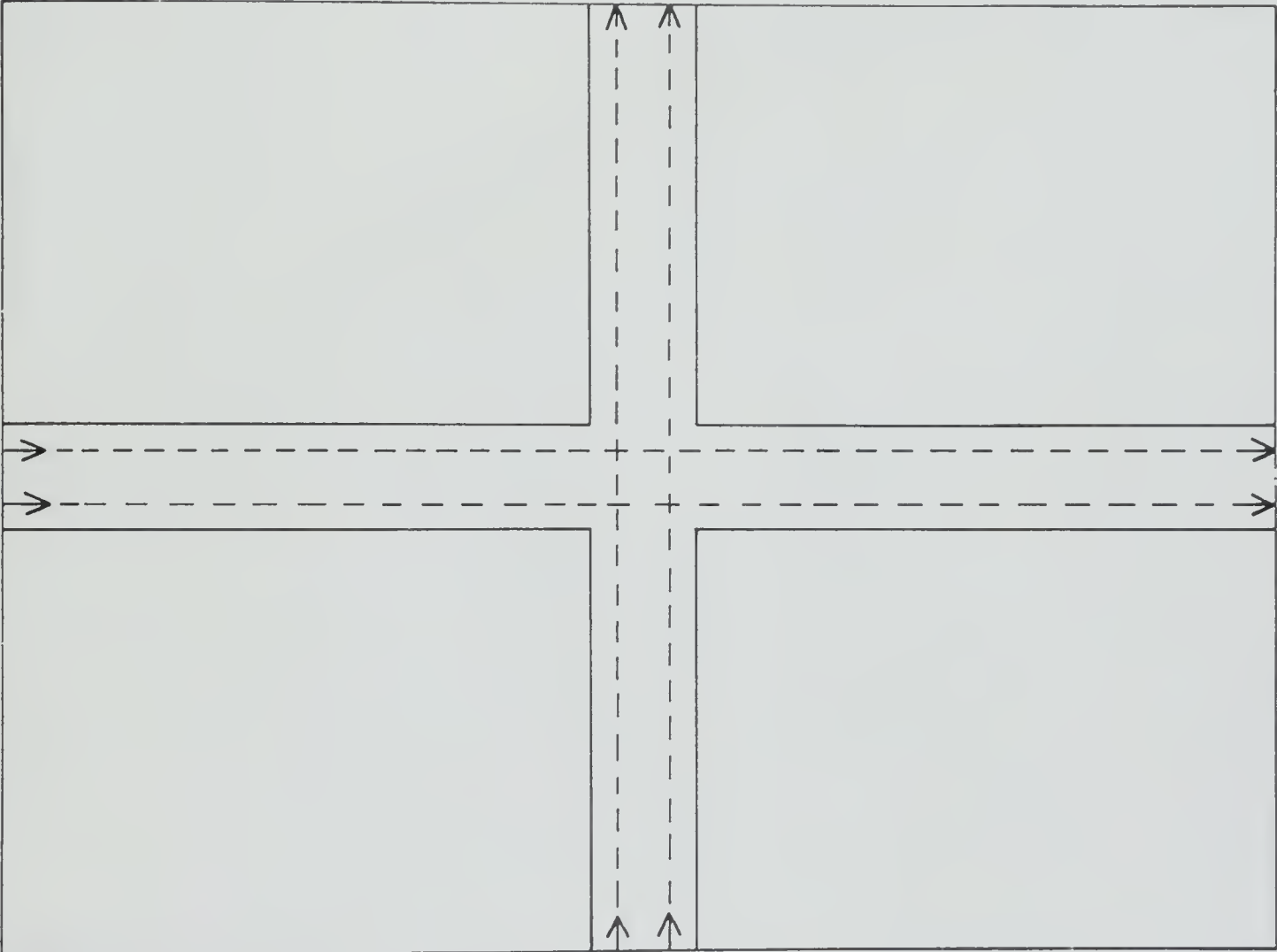
a. Ask the student to demonstrate northerly traffic movement on the vertical street.

b. Ask the student to demonstrate southerly traffic movement on the vertical street.

c. Ask the student to demonstrate eastward traffic movement on the horizontal street.

d. Ask the student to demonstrate westward traffic movement on the horizontal street.

DIAGRAM



Lesson 16: Demonstrating Traffic Movement on One-Way Streets; Making Left and Right Turns

Prerequisite Skills and Concepts

All previous lessons in Part II

Objective

a. The student will be able to demonstrate left and right turns of traffic on a one-way street from:

1. northerly direction
2. southerly direction
3. westward direction
4. eastward direction

Materials

- a. Baseboard
- b. Four rectangles (8" x 11")
- c. Two model cars

Procedure

a. Direct the student to construct a standard intersection.
(See diagram)

1. Designate the vertical street as one-way north bound.
2. Designate the horizontal street as one-way west bound.

b. Direct the student to tactually inspect the model cars.

1. Identify the front of the car.
2. Identify the rear of the car.

c. Demonstrate a left turn on one-way streets. Direct the student to place two cars at the south end of the vertical street. Place one car near the east side/edge/curb and place one car near the west side/edge/curb.

d. Direct the student to place his left hand on the left car. Guide the student's hand to the intersection, staying close to the west side/edge/curb. Make a left turn staying close to the near side/edge/curb and continue guiding the student's hand until the west end of the horizontal street is located.

e. Have the student repeat the procedure without assistance. Demonstrate a left turn from the north bound street to the west bound street using the car placed near the west side/edge/curb of the vertical street.

f. Repeat the procedure using the car placed near the east side/edge/curb of the vertical street.

g. Explain how traffic may turn from either side of the street when moving on one-way streets.

h. Follow the same procedure and demonstrate* left and right turns on one-way streets from the north end of the vertical street and from the east and west ends of the horizontal street.

*Note:

In demonstrating left and right turns from different positions on the baseboard it may be helpful to have the student rise from his chair and move to the end of the street from which a turn is to be executed.

Evaluation

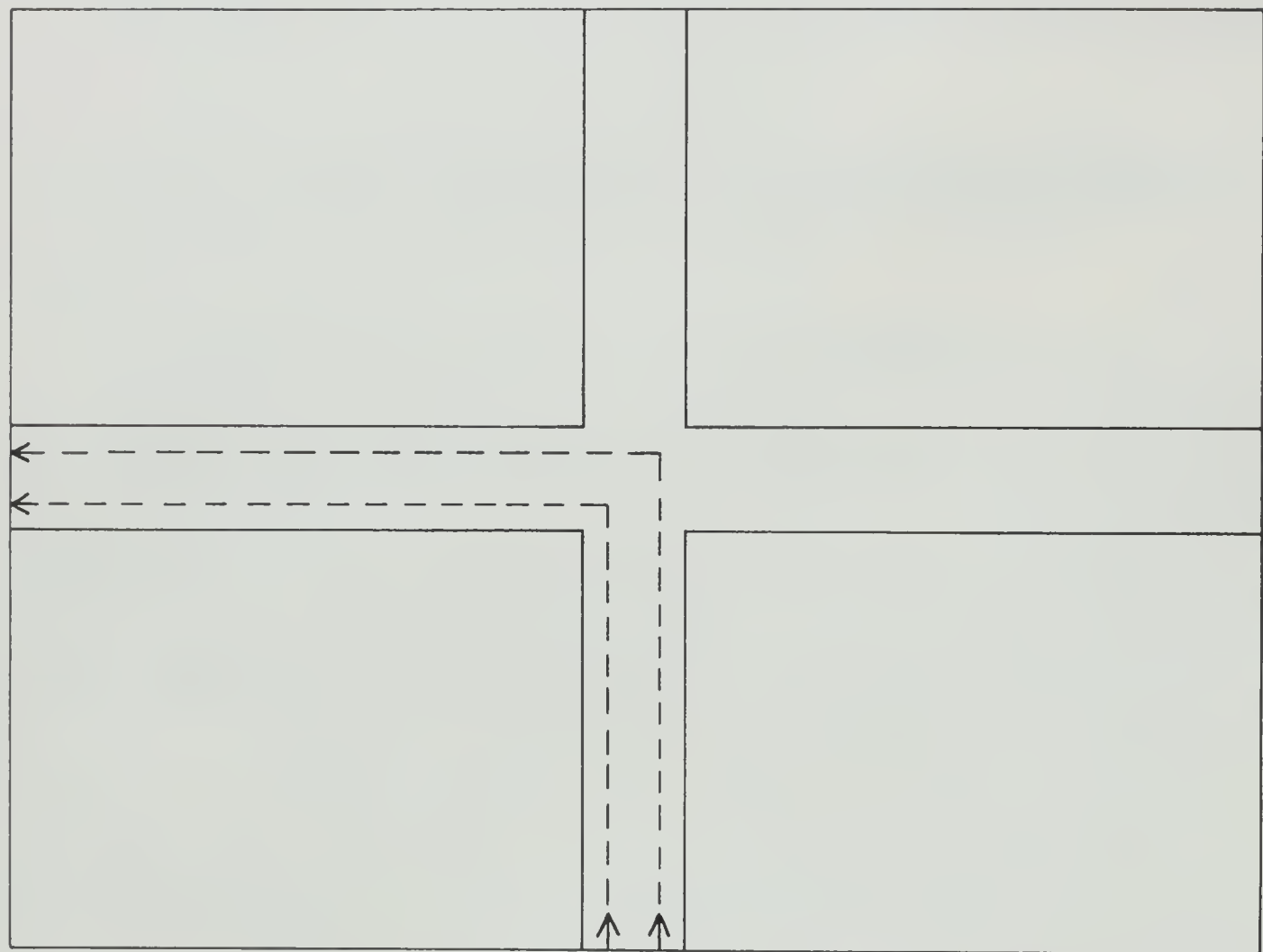
a. Ask the S to demonstrate a left and right turn from a north-bound street.

b. Ask the S to demonstrate a left and right turn from a south-bound street.

c. Ask the S to demonstrate a left and right turn from an east-bound street.

d. Ask the S to demonstrate a left and right turn from a west-bound street.

DIAGRAM



Lesson 17: Pedestrian Traffic Flow

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will be able to identify and locate the pedestrian crossing areas within a standard intersection.
- b. The student will be able to demonstrate the directional flow of pedestrian traffic as it moves from corner to corner at a standard intersection.

Materials

- a. Baseboard
- b. Four rectangles (8" x 11")
- c. Eight strips of velcro* (1/8" x 2")

*Note:

The strips of velcro will be used to represent crosswalks at the intersection.

Procedure

- a. Direct the student to construct a standard intersection.
 1. Identify four blocks
 2. Identify two streets
 3. Identify four corners
- b. Assign cardinal directions to each corner of the intersection, i.e., northwest, southwest, northeast, and southeast corners. Direct the student to locate and identify each corner using cardinal directions.
- c. Place the eight velcro strips on the baseboard forming crosswalks at the intersection. (See diagram)
- d. Show the student the velcro strips and explain that each pair of strips represents the crosswalk lines painted on the street, i.e., pedestrians cross the street within the crosswalk area.
- e. Direct the student to locate the northeast corner of the intersection and place both index fingers on the corner.

f. Assist the student in moving his right index around the intersection. Tell the student to keep his left finger on the northwest corner to establish a point of reference. Move from the NW to SW to SE to NE to the NW corner. (See diagram, figure 1)

g. Direct the student to repeat the procedure unassisted. Explain* to the student that his index finger is "walking around the intersection" within the crosswalk area.

*Note:

Describe the appearance of a crosswalk area. Explain that often lines are painted (yellow, white) on the street (from curb to curb) to define an area where pedestrians are to walk when crossing a street. Explain that crosswalks are situated near the corners of an intersection.

h. Direct the student to locate the northeast corner of the intersection and place both index fingers on the corner.

i. Assist the student in moving his left index finger around the intersection. Tell the student to keep his right finger on the northeast corner to establish a point of reference. Move from the NE to SE to SW to NW to the NE corner. Direct the student to identify each corner (cardinal directions) he locates and the direction of each movement. (See diagram, figure 2)

j. Correct errors and review.

Evaluation

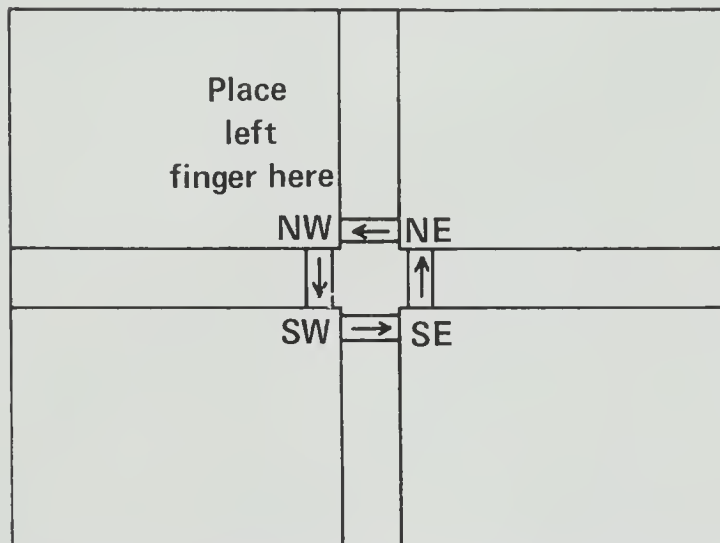
a. Ask the student to place four pairs of velcro strips in the proper positions to form four crosswalks within a standard intersection.

b. Ask the student to demonstrate pedestrian traffic flow at a standard intersection within the four crosswalk areas.

1. Begin at the southwest corner. Move north and locate the three remaining corners, then return to the southwest corner.
2. Begin at the southeast corner. Move north and locate the remaining corners, then return to the southeast corner.

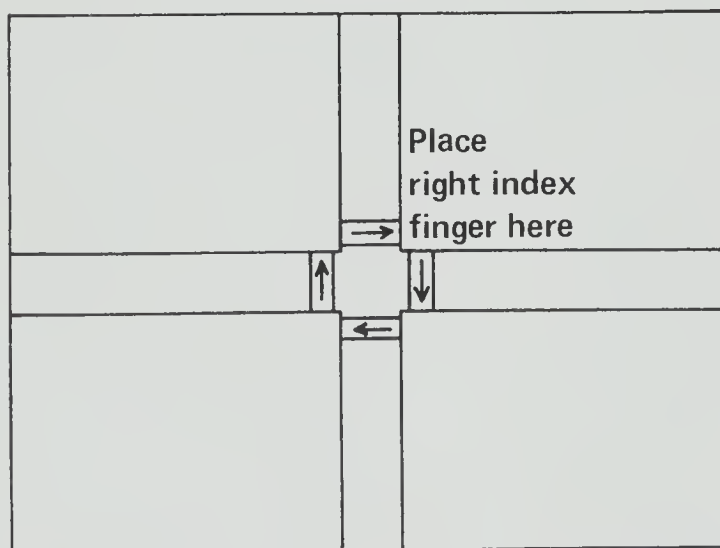
DIAGRAM

Figure 1



Move right index finger in the direction of the arrows.

Figure 2



Move left index finger in the direction of the arrows.

Lesson 18: Grid Pattern

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will identify and locate
 1. Six blocks
 2. Three streets
 3. Two intersections
 4. Eight corners

Materials

- a. Baseboard
- b. Four rectangles (8" x 11")
- c. Six rectangles (8" x 6 1/2")

Procedure

- a. Direct the student to construct a standard intersection using four rectangles (8" x 11"). Review identifying and locating four blocks, two streets, and four corners.
 1. Designate the long street as the horizontal street.
 2. Designate the short street as the vertical street.
- b. Construct a grid pattern using six rectangles (8" x 4 1/2") to represent two standard intersections. (See diagram) Direct the student to examine the grid pattern. Emphasize a systematic scan of the workspace.
- c. Show the student the flannel area which represents the horizontal street.
- d. Show the student the flannel area which represents the two vertical streets.
- e. Direct the student to locate and identify the horizontal and vertical streets composing the grid pattern.

f. Show the student the six rectangular pieces which represent each of the six blocks.

g. Direct the student to locate and count the number of blocks represented in the grid pattern.

h. Direct the student to locate the intersection on the left side of the baseboard.

i. Show the student each of the four corners in the left intersection.

j. Direct the student to locate the intersection on the right side of the baseboard.

k. Show the student each of the four corners of the right intersection.

l. Direct the student to locate the eight corners composing the two intersections within the grid pattern.

m. Direct the student to locate the horizontal and vertical streets, six blocks, and eight corners composing the grid pattern.

n. Correct errors and review.

Evaluation

a. Ask the student to construct a grid pattern on the baseboard.

b. Ask the student to identify and locate the horizontal and vertical streets.

c. Ask the student to locate and count the intersections within the grid pattern.

d. Ask the student to locate and count the six blocks composing the grid pattern.

e. Ask the student to locate and count the eight corners composing the grid pattern.

DIAGRAM



Grid Pattern
* left intersection
right intersection

Lesson 19: Familiarization with a "T" intersection

Prerequisite Skills and Concepts

All previous lessons in Part II

Objectives

- a. The student will be able to construct a "T" intersection.
- b. The student will be able to identify the components of a "T" intersection.
 1. Two streets
 2. Two corners
 3. Discontinuation of one street
 4. "T" configuration

Materials

- a. Baseboard
- b. Two rectangles (8" x 11")
- c. One rectangle (4 1/2" x 17 3/4")

Procedure

- a. Construct a "T" intersection. (See diagram) Show the student the horizontal and vertical street. Explain that a "T" intersection is named so because it's shaped like the letter T.
- b. Direct the student to locate the intersection of the two streets and count the corners. Explain that there are only two corners at a "T" intersection because the vertical street does not continue its course.
- c. Demonstrate to the student how the vertical street stops at the intersection. Have the student locate the near end of the vertical street. Place the right index finger on the right edge/side/curb and the left index finger on the left edge/side/curb.
- d. Direct the student to move his index fingers toward the intersection. Have the student continue to move his fingers across the intersection until he contacts the far edge/side/curb of the horizontal street. Explain to the student that the vertical street stops at the horizontal street.

e. Direct the student to locate the left end of the horizontal street and place one hand on the far edge/side/curb of the horizontal street. Have the student move his hand to the right end of the horizontal street. Show the student that the vertical street does not intersect the far edge/side/curb of the horizontal street.

f. Repeat the procedure and show the student how the vertical street intersects with the near edge/side/curb of the horizontal street. Explain to the student that the vertical street stops when it intersects with the horizontal street.

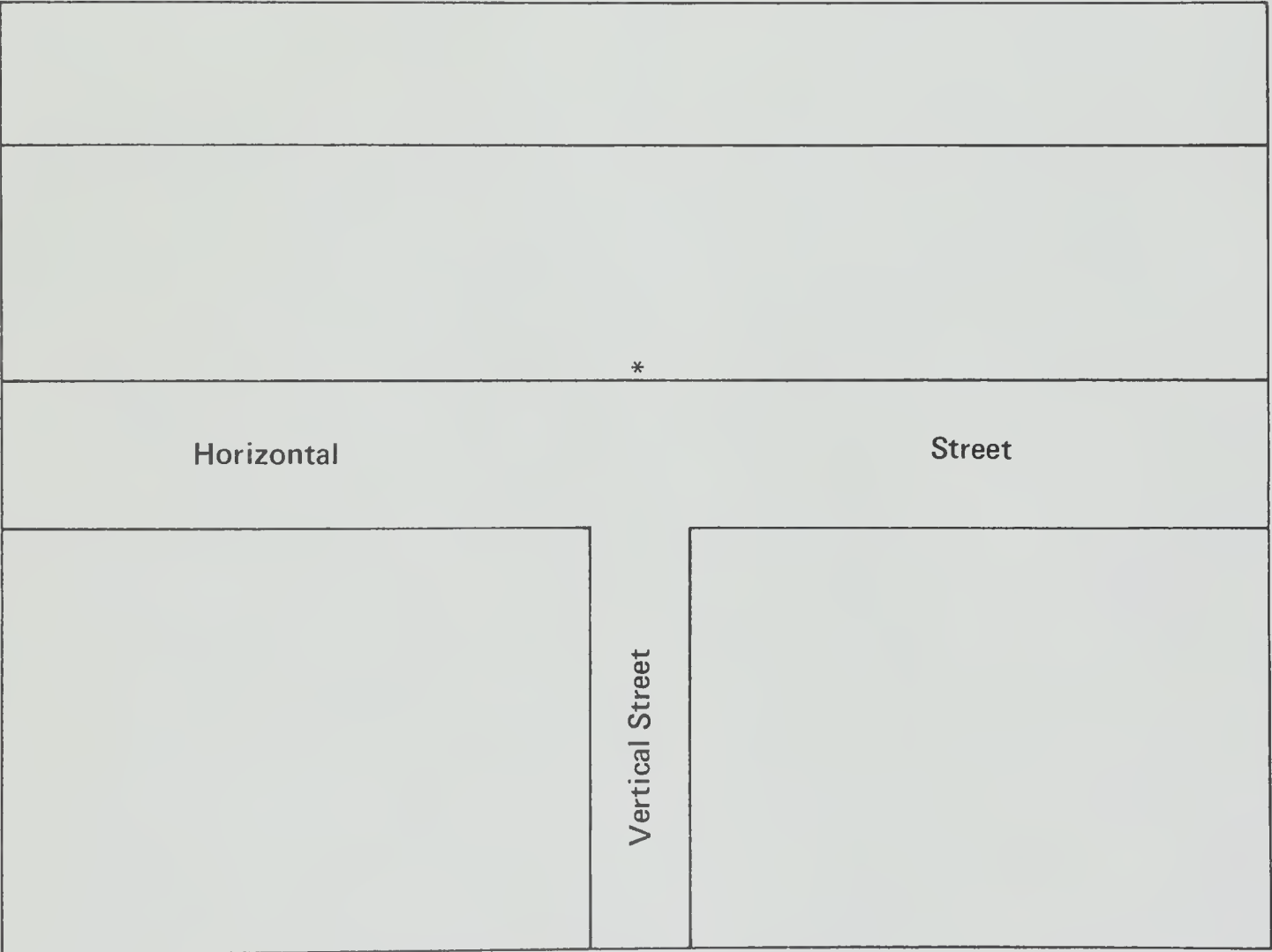
g. Correct errors and review.

h. Discuss the other orientations of the "T" intersection, i.e., 

Evaluation

- a. Ask the student to construct a "T" intersection.
- b. Ask the student to locate the components of the "T" intersection.
 1. Two streets
 2. Two corners
 3. Far edge/side/curb of horizontal street opposite vertical street.

DIAGRAM



*Discontinuation of vertical street

